



THE GEOMETRY OF LEARNING

# Experiences Teaching in the Round

Dr. Jon Dorbolo, Oregon State University  
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Amy Donohue, Bora Architects

Overview: Oregon State University Learning Innovation Center

Results: Initial Research Findings from The Geometry of Learning

The Faculty Experience: Supporting Teaching in the Round

Lessons Learned: Next Generation Teaching Environments at Texas A&M

# Overview: Oregon State University Learning Innovation Center











Development Prerequisites

- Office programs store personal data with docs
- Python 2.x/3.x/conda
- Prepared Menu
- RoverWare
- Kubernetes/Minikube
- Inherited Dockerfile

Pat Noonan

Mambi Madziva





LEARNING  
INNOVATION  
CENTER

# Original Program

State-of-the-art classrooms to meet a variety of teaching and learning styles.  
A projection of requirements for new modern classroom space includes:

(1) 600-1200 seats

(1) 150 seats

(1) 400 seats

(2) 125 seats

(2) 300 seats

(2) 80 seats

(1) 250 seats

(3) 60 seats

(1) 200 seats

(2) 35 seats



# UNIVERSITY GOAL



INCREASE RETENTION + GRADUATION RATES



ENHANCE **LEARNING & ENGAGEMENT** AT OSU  
and

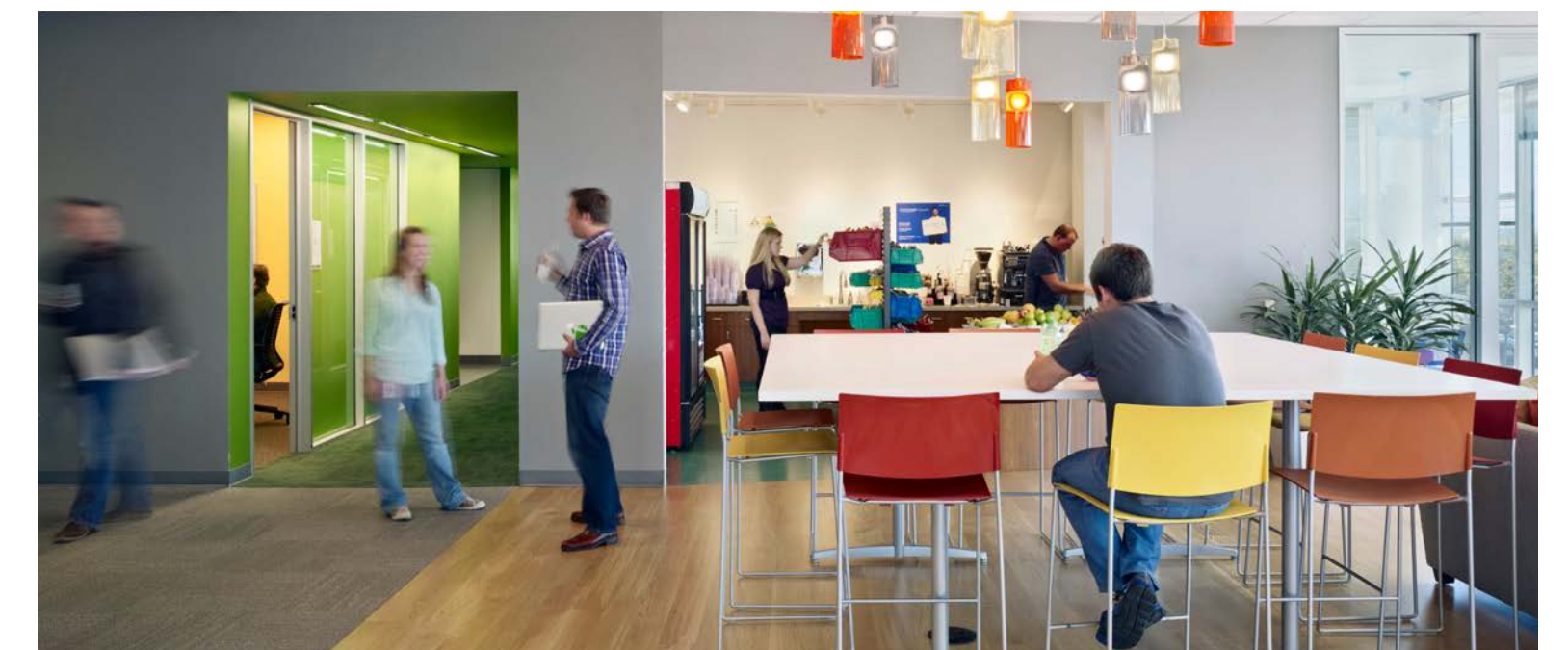
ACCOMMODATE **GROWTH** OF THE STUDENT POPULATION

# PROJECT GOALS

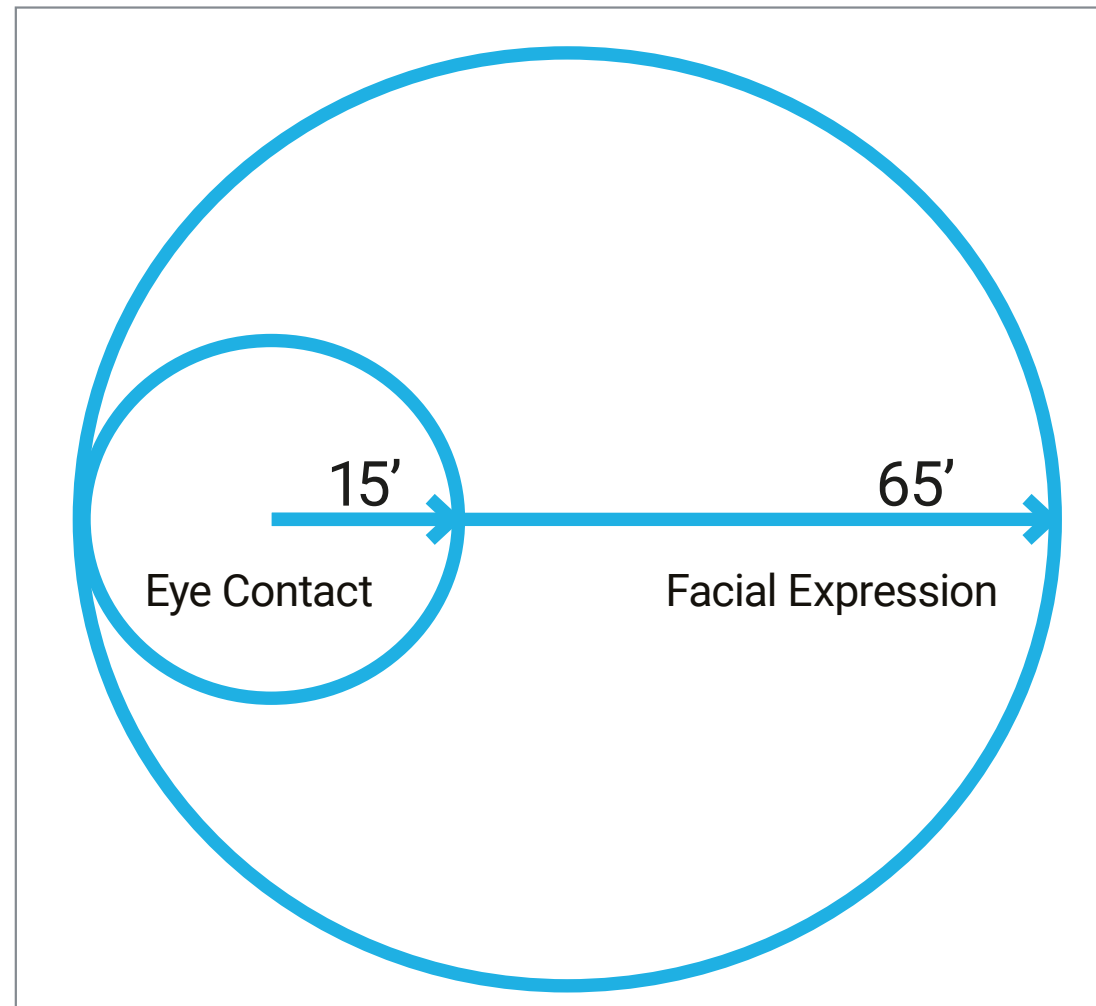
CREATE AN INSPIRING **TEACHING LABORATORY** FOR THE CAMPUS

PROMOTE **ACTIVE LEARNING** AND ENGAGEMENT ACROSS ALL ABILITIES  
AND AT ALL SCALES OF CLASS SIZES

ENHANCE INTERACTIONS AMONGST AND BETWEEN ALL USER GROUPS TO  
CULTIVATE **VIBRANT COMMUNITY**



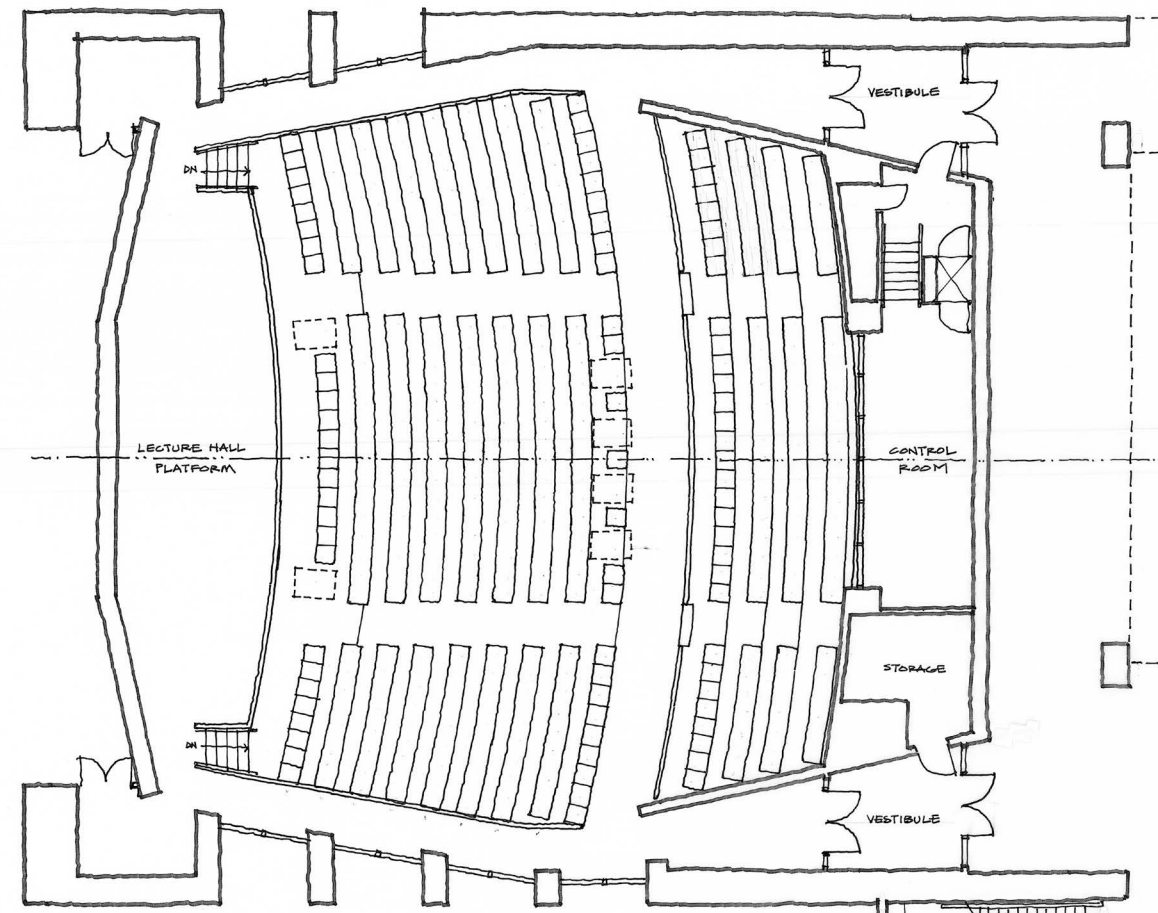
# Active Learning Spatial Characteristics



Visibility		Proximity		Mobility		Flexibility	
To Faculty		Eye Contact		Of Faculty		Furniture	
To Media		Facial Expression		Of Students		Space	
To Peers		Shared Work Surface		Of Media		Over Time	

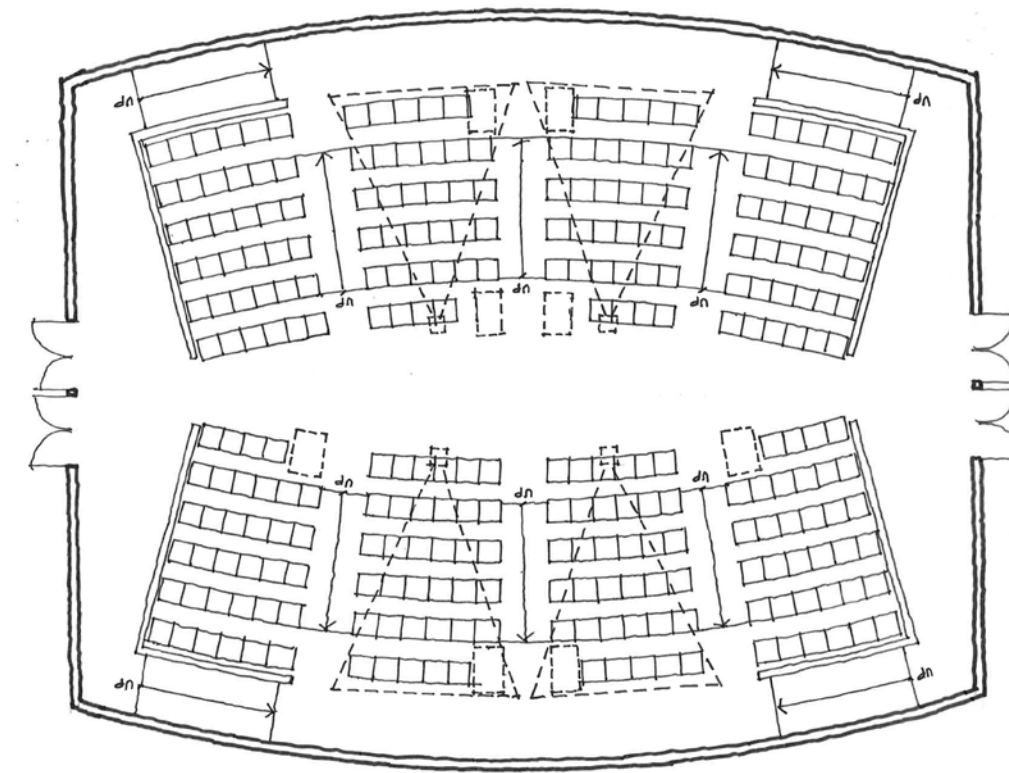
# SAGE ON STAGE

400-600  
14 sf/seat



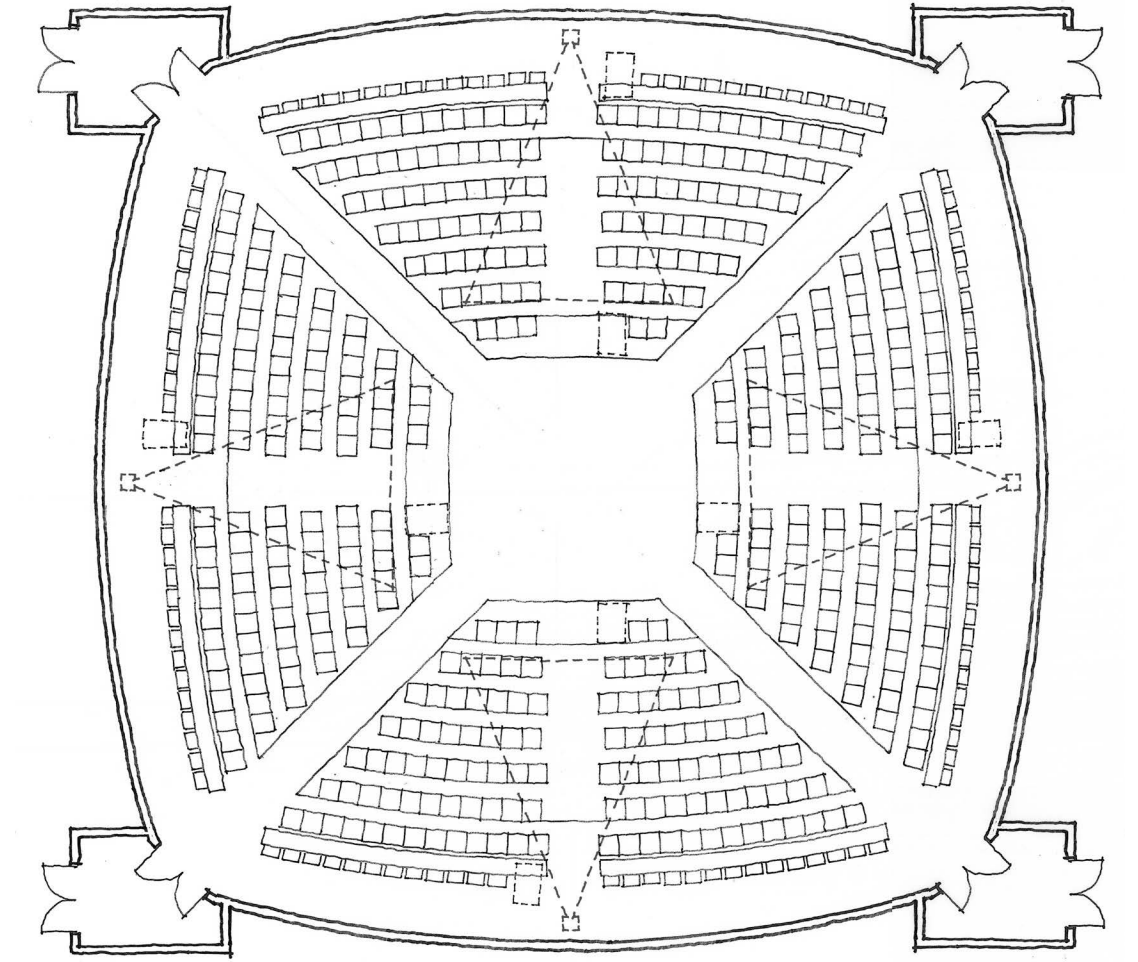
# PARLIAMENT

200-300 seats  
16 sf/seat



# PHIL DONAHUE

500-600 seats  
16 sf/seat

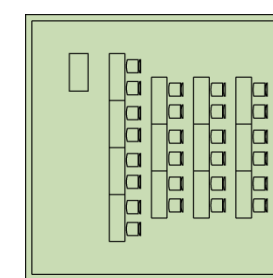
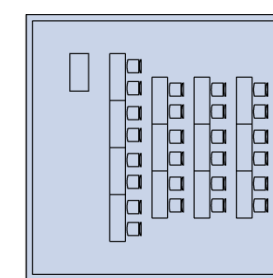
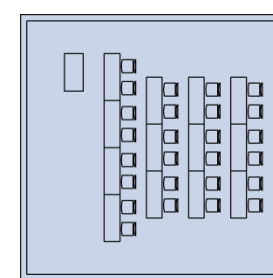
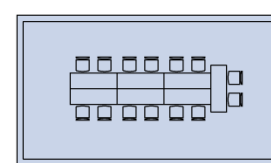
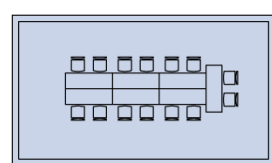
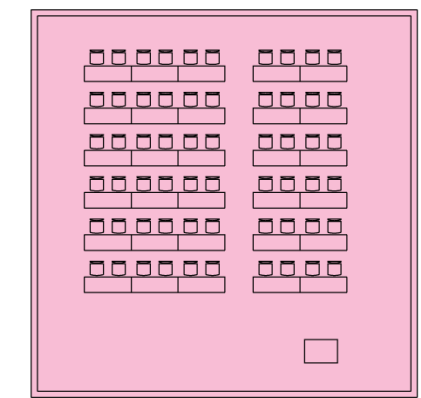
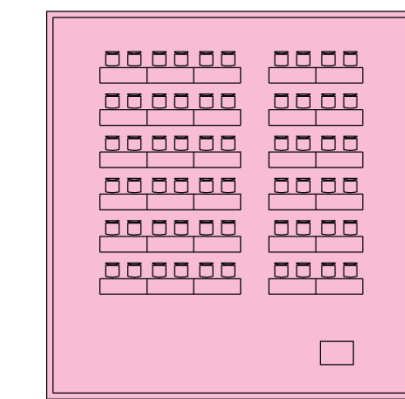
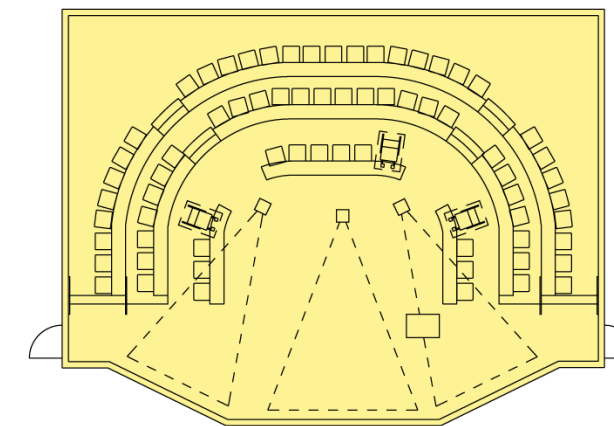
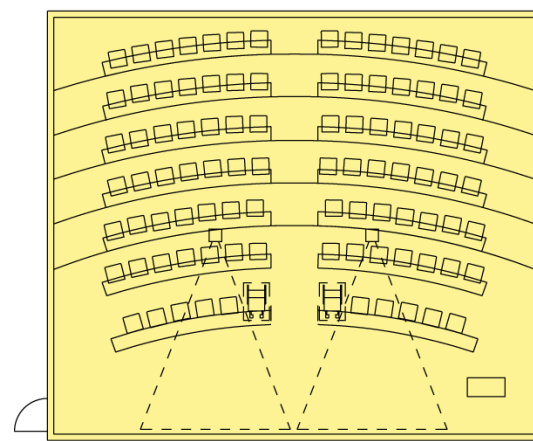
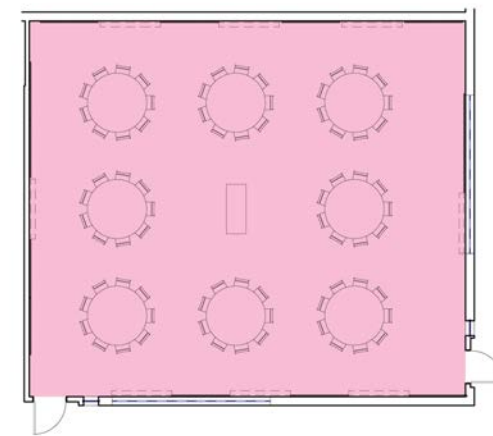
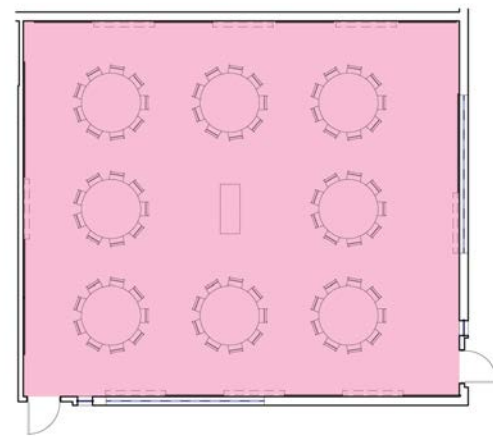
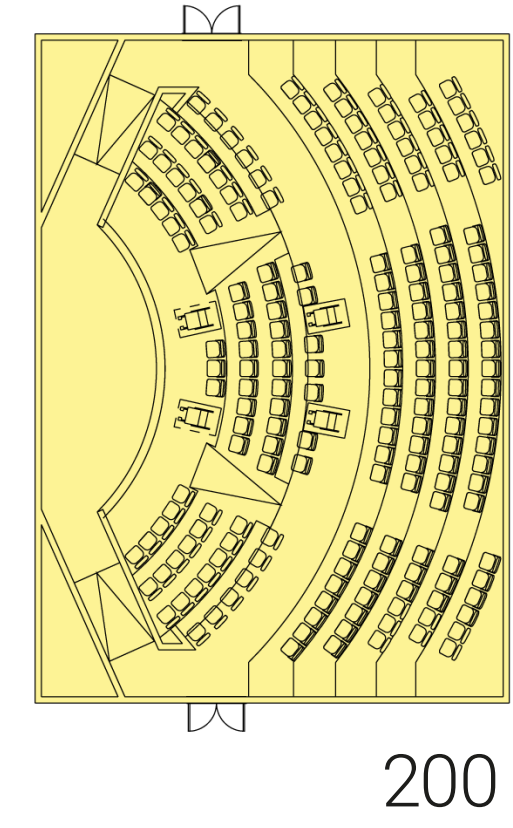
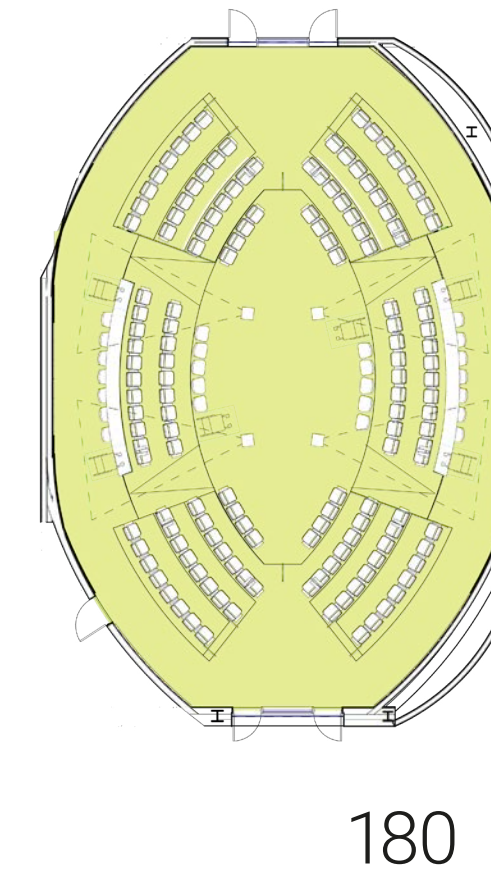
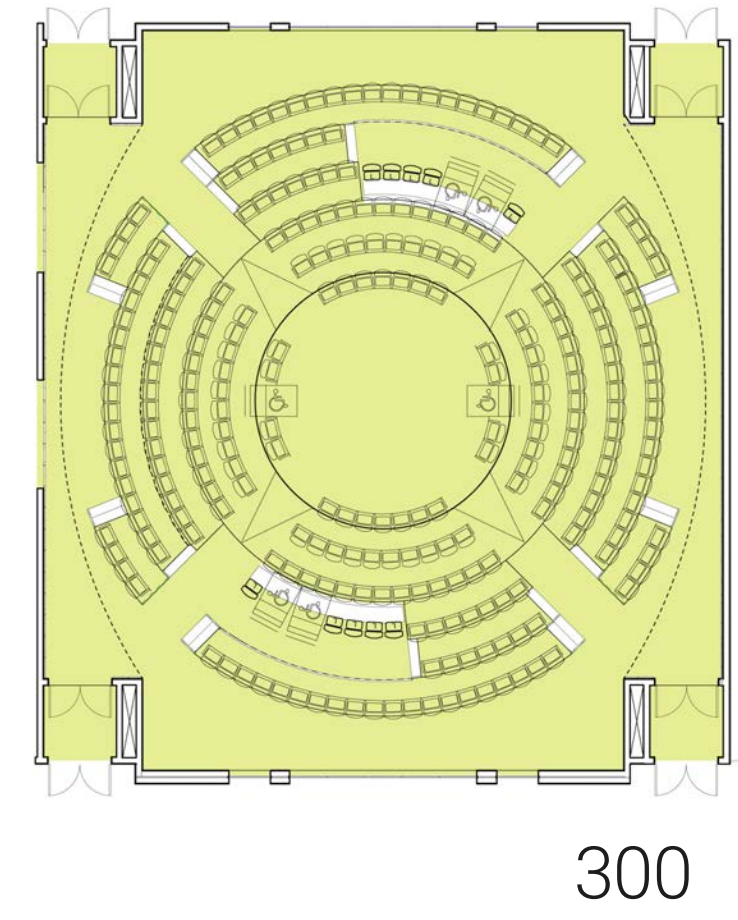
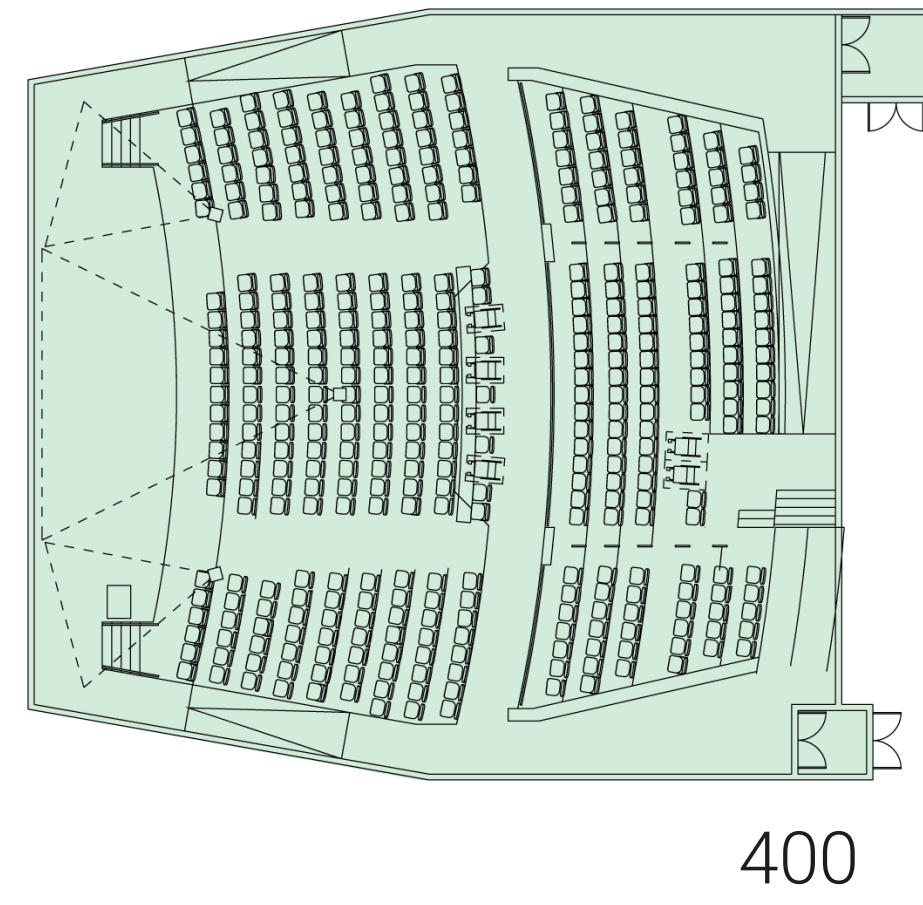
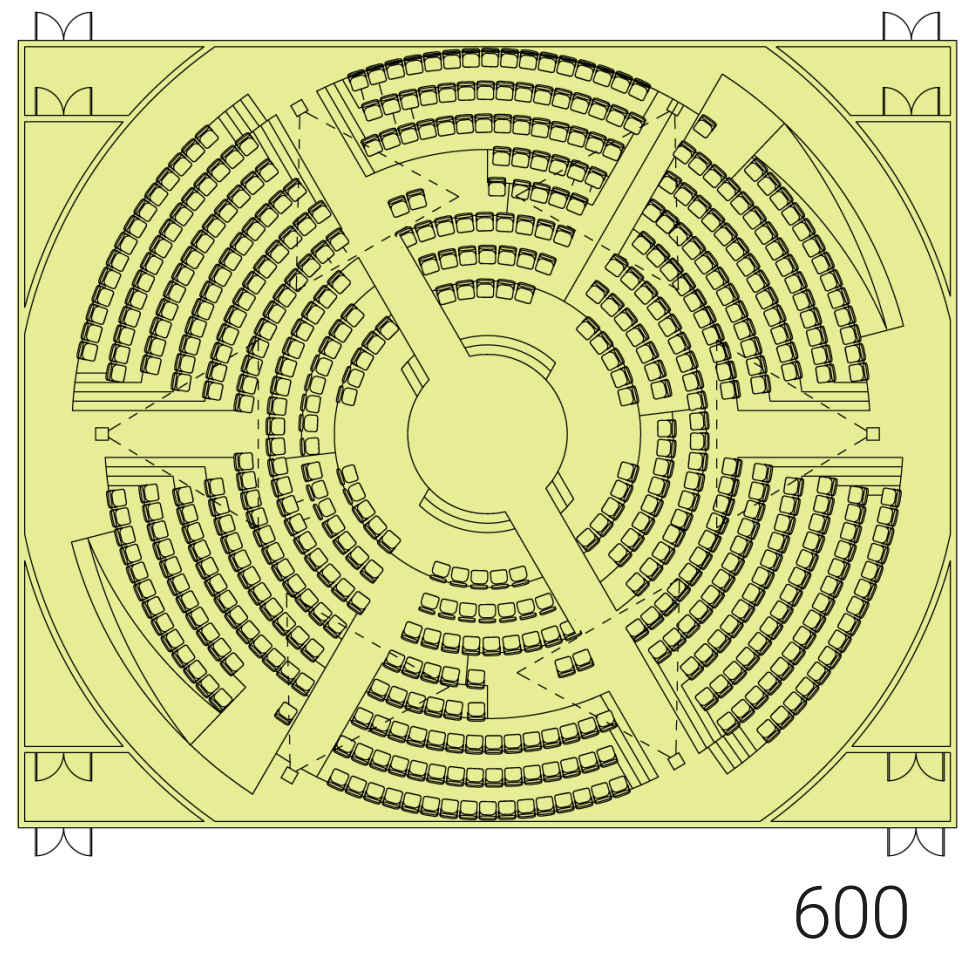








# Building Program — Formal Learning Program

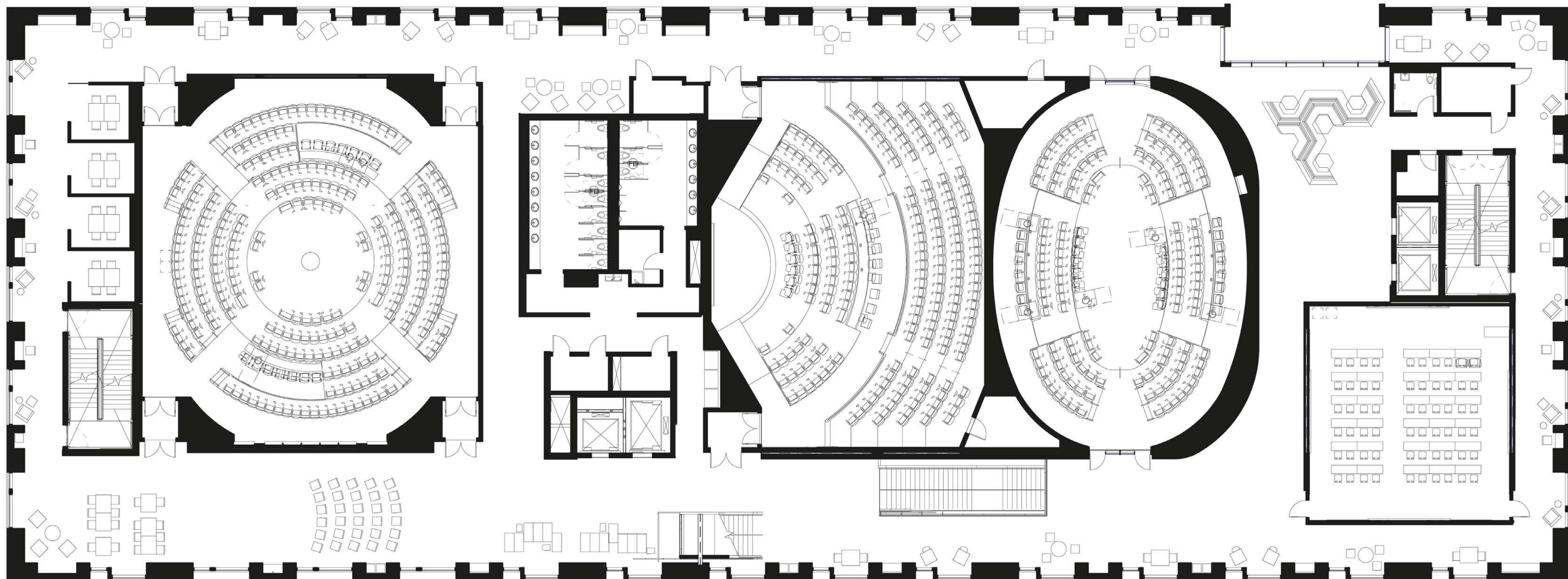


2145-2270 Total Classroom Seats

Integrated Instructional Resource Center

University Honors College







lysosomes  
Channel 31  
Session ID thirtyone

- Golgi Apparatus, transport vesicles & lysosomes
- Golgi: repackaging
- Transport vesicles:
  - Secretory vesicles
  - Membrane renewal vesicles
- Lysosomes: digestive enzymes



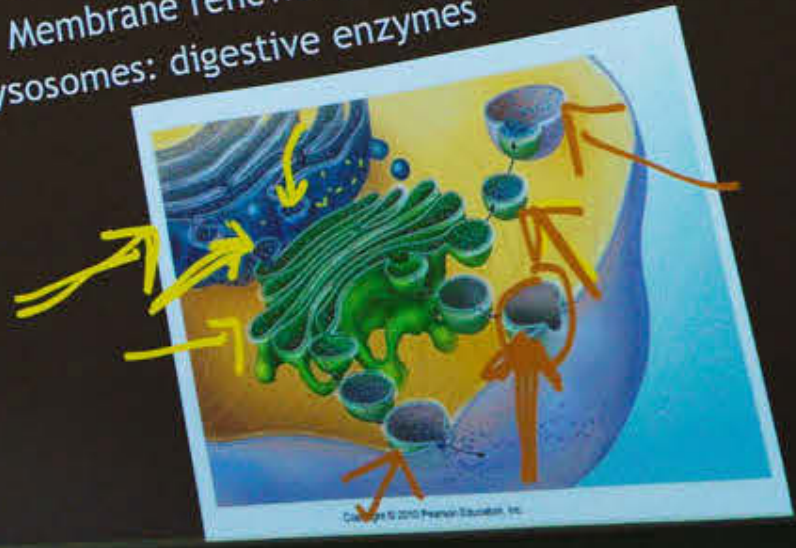
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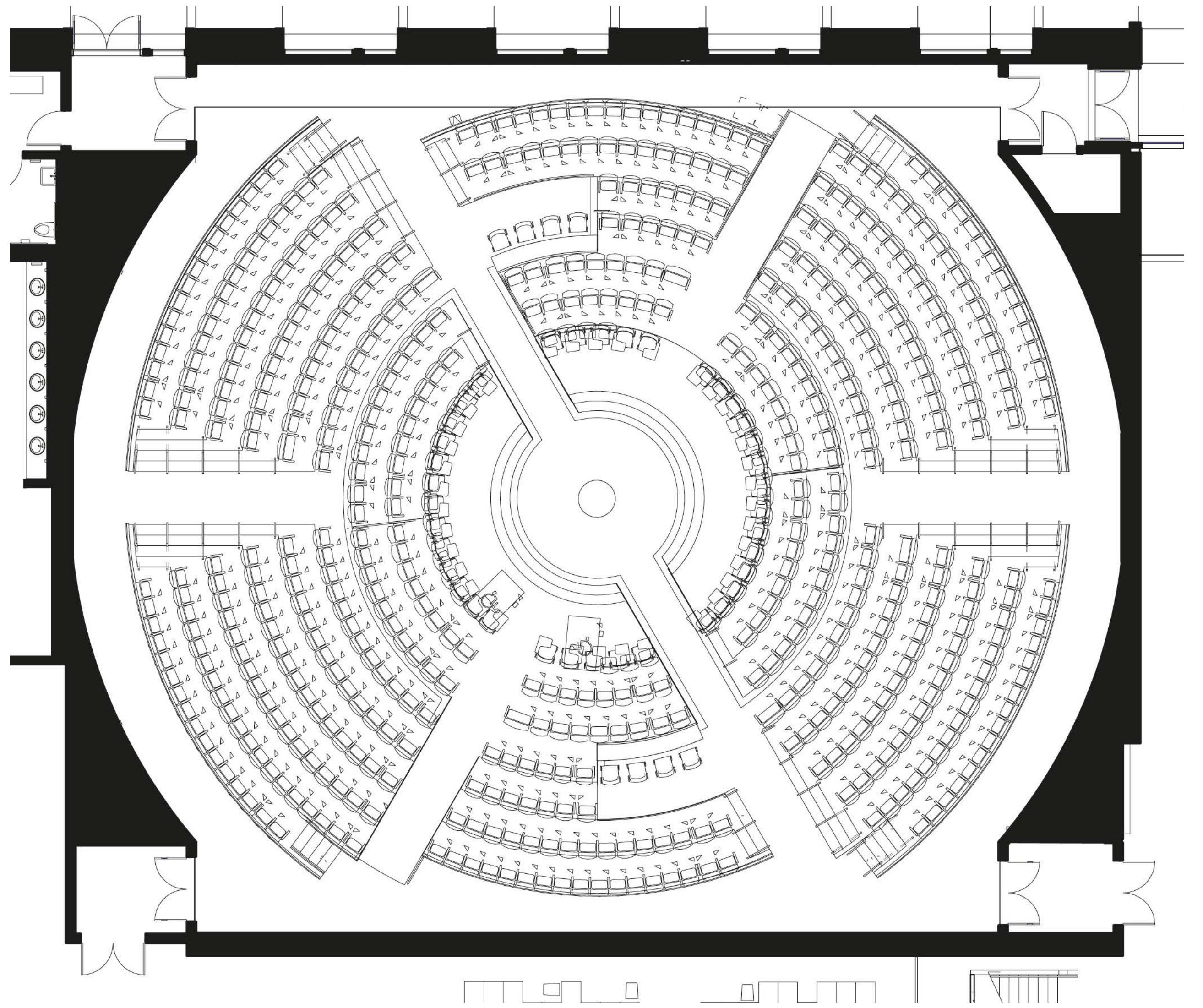
e 3.6

Module 3.6

Module 3.6

Module





### What are the Variables of Interest?

- Differs between tasks

	Displacement	Distance	Elapsed Time	Velocity	Speed
Making a putt in golf	X				
Competing in a race		X	X		X
Completing a pass	X		X	X	
Using a computer mouse					

### What are the Variables of Interest?

- Differs between tasks

	Displacement	Distance	Elapsed Time	Velocity	Speed
Making a putt in golf	X				
Competing in a race		X	X		X
Completing a pass	X		X	X	
Using a computer mouse					

### What are the Variables of Interest?

- Differs between tasks

	Displacement	Distance	Elapsed Time	Velocity	Speed
Making a putt in golf	X				
Competing in a race		X	X		X
Completing a pass	X		X	X	
Using a computer mouse					

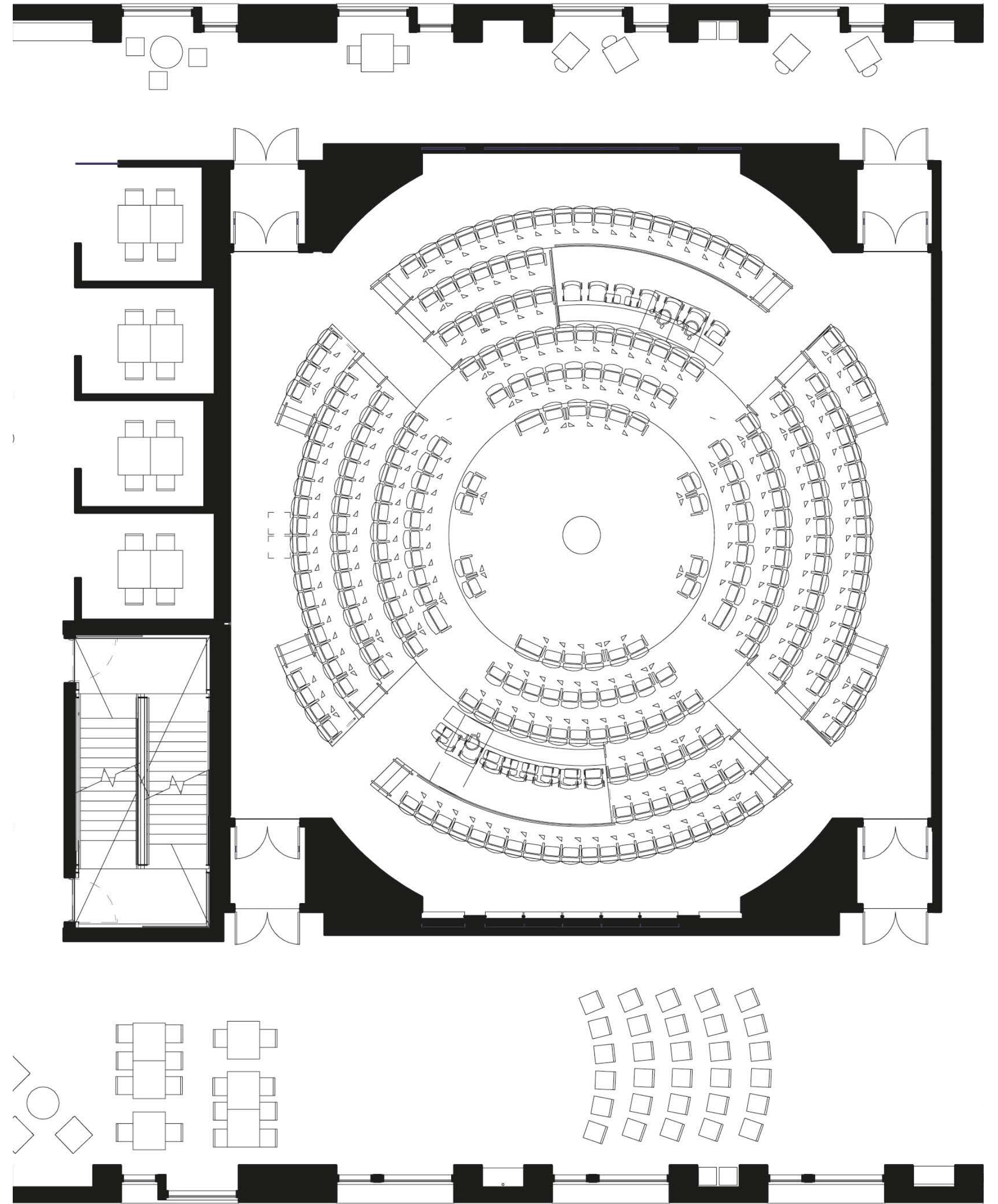
### What are the Variables of Interest?

- Differs between tasks

	Displacement	Distance	Elapsed Time	Velocity	Speed
Making a putt in golf	X				
Competing in a race		X	X		X
Completing a pass	X		X	X	
Using a computer mouse					







# Faculty Support: Classroom Technology



# Faculty Support: Integrated Learning Resource Center

## CENTER FOR TEACHING AND LEARNING

FACULTY LOUNGE /  
COLLABORATION SPACE  
KNOWLEDGE CENTER  
CONSULTING ROOMS



## TECHNOLOGY ACROSS THE CURRICULUM

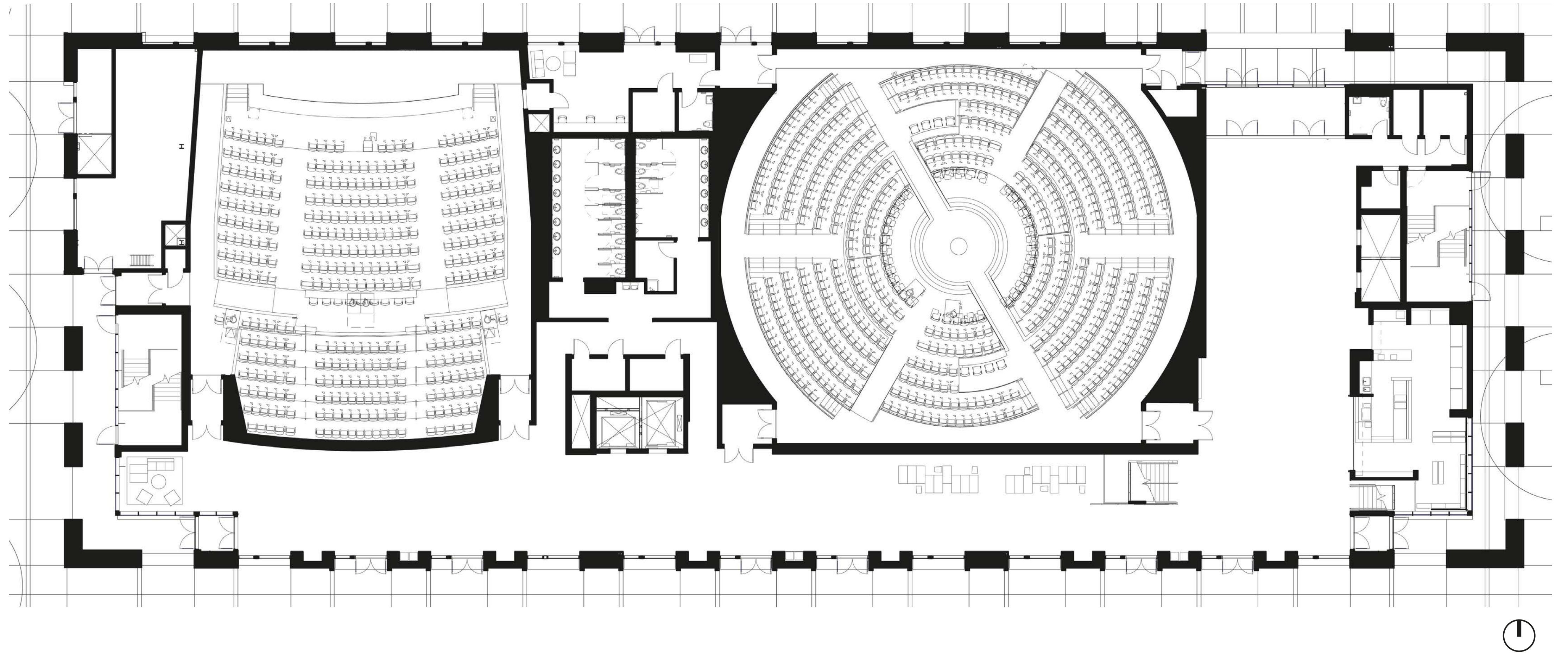
GREEN SCREEN STUDIO  
MEDIA RECORDING/EDITING ROOMS  
TEST CLASSROOM



## CLASSROOM TECHNOLOGY SERVICES

SUPPORT CALL CENTER  
ASSEMBLY / REPAIR CENTER  
MASTER CONTROL SUITE

# Faculty Support: Green Room






### Inferential Statistics

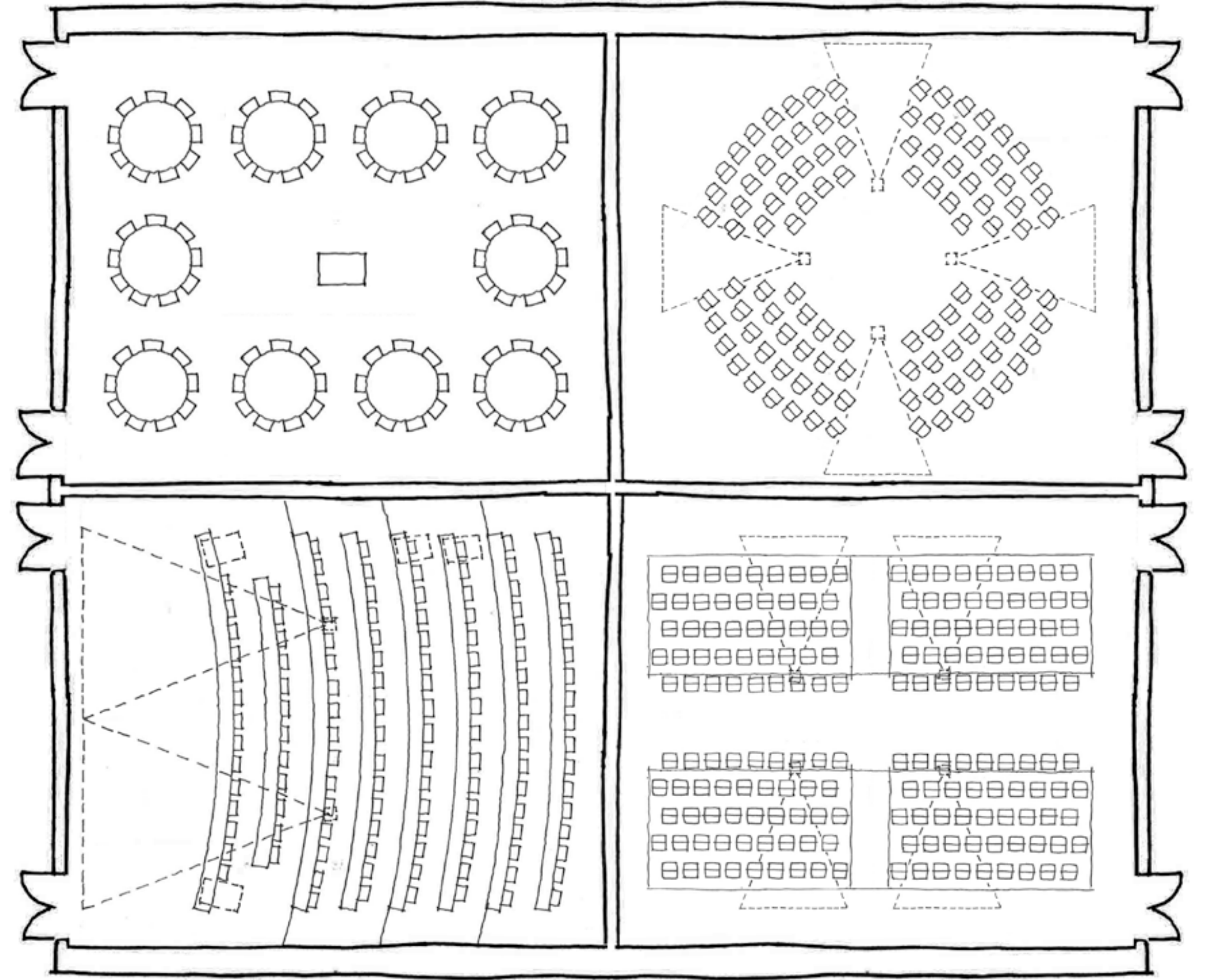
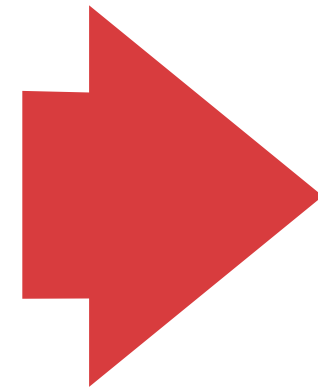
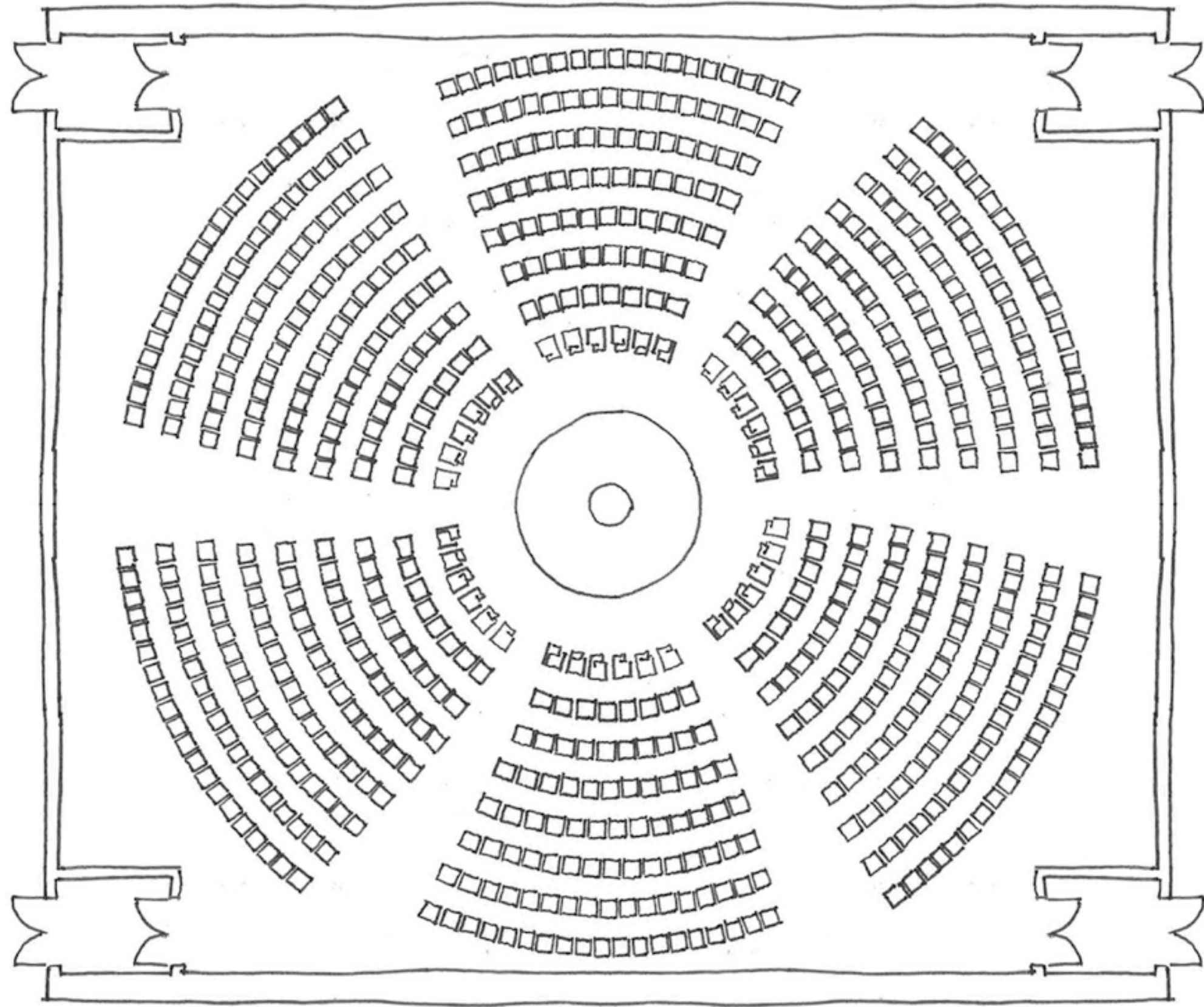
Paying Attention to Methodology

- In *cross-sectional studies*, different groups are studied at the same time.
- In *longitudinal studies*, the same group is studied over time.
- Cross-sectional studies show the effects of time and environment on many different individuals.

#### How to Avoid Inferential Errors

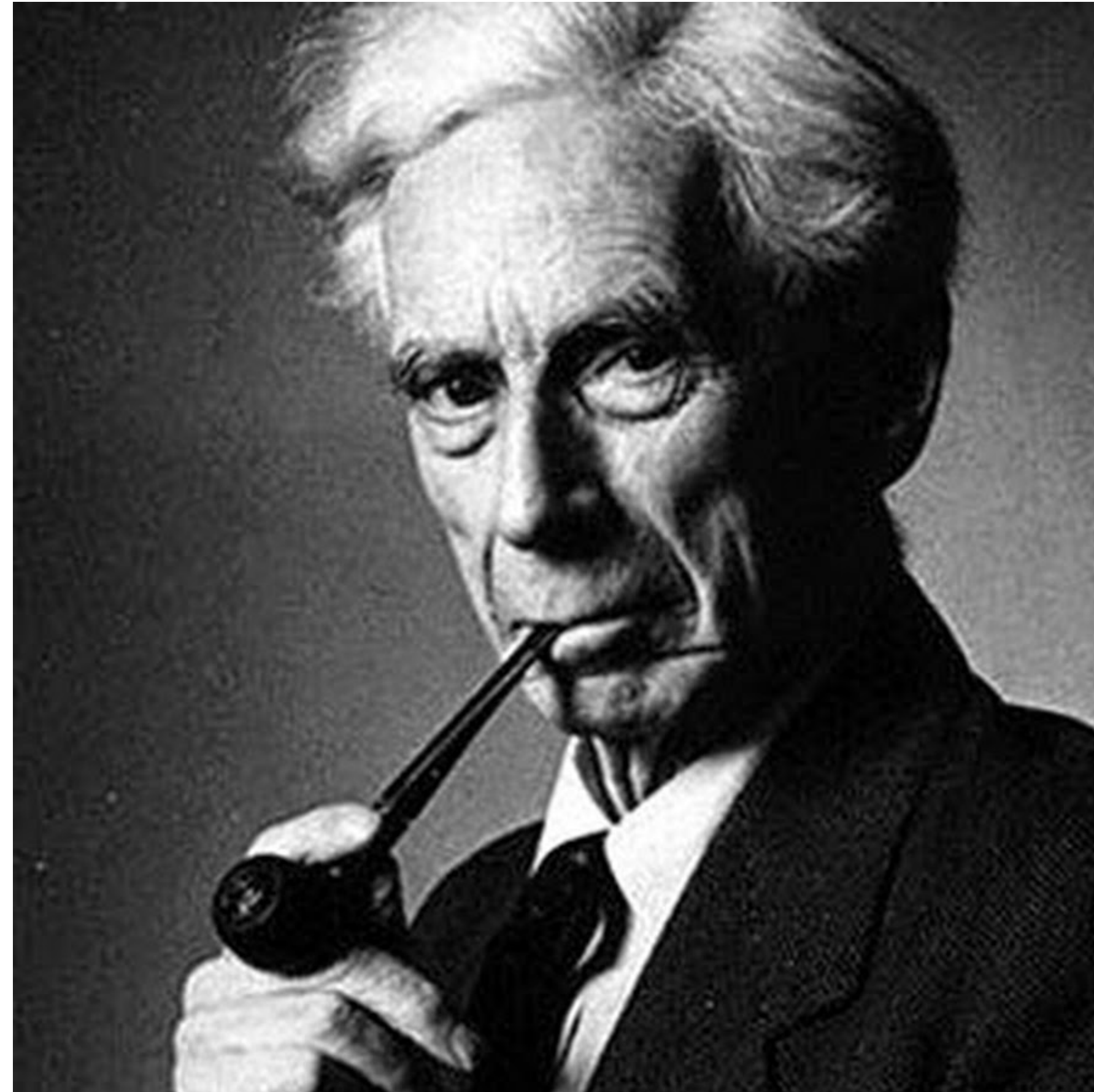


# Adaptability



# Results: Initial Research Findings from The Geometry of Learning

Interesting idea. What is your evidence?







# Research: The Geometry of Learning

Inter-institutional Research Team

## Texas A&M

Mary Shannon Williams, *Post Doc Center for Teaching Excellence*

## UCLA

Kim DeBarcco, *Online Teaching & Learning Initiative*

## Bora Architects

Kate Feiertag, *Architect*

## Oregon State University

Becky Warner, *Sociology*

Bill Loges, *New Media Communication*

Lynne Hindeman, *Education*

Jon Dorbolo, *Philosophy, Academic Technology*

# Research: The Geometry of Learning

Multiple Data Sources, Multiple Methods

## Institutional Data

- Comparing student outcomes in round and rectangle rooms
- Correlating student outcomes in round rooms with seat choices and social networks

## Data from Students

- Seating choices - validating clickers as response method
- Questionnaires about their performance and relationships in different room types

## Data from Instructors

- Semi-structured interviews

## Learner Survey

## Observational Protocol

## Data from the Rooms: Physical Factors

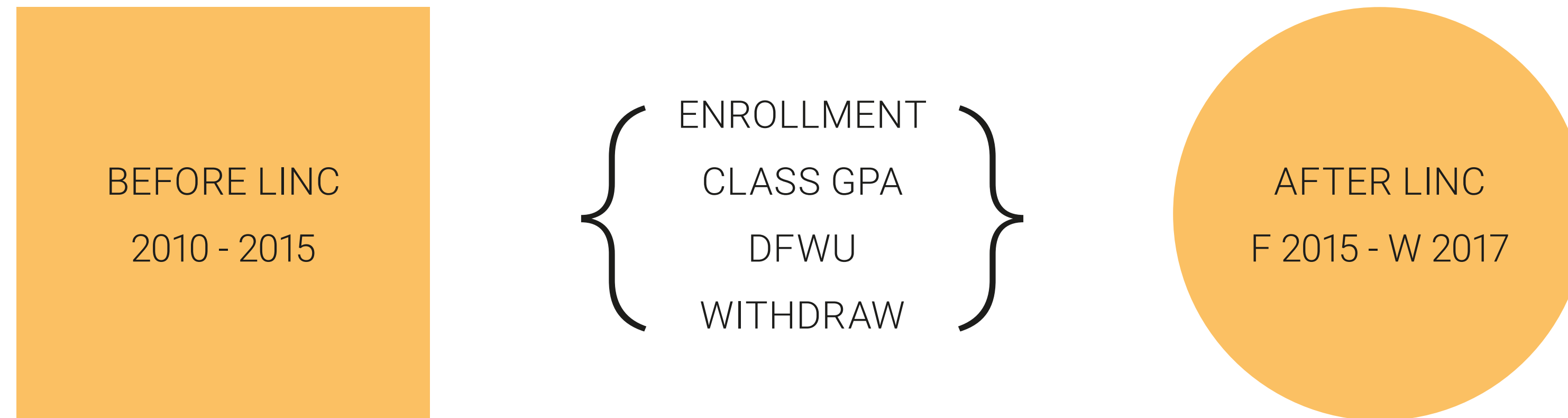
- Lighting
- Audio
- Distance to screens, instructors, and exits
- Instructor mobility

**Academic Harm** = Elements of the academic process and environment that correlate with decreased learner performance or increased course withdrawal.



Academic harm raises student risk including lengthened time to degree and disenrollment.

# THE GEOMETRY OF LEARNING *AT THE CIRCUMFERENCE*



Do the learning-in-the-round rooms correlate to academic harm?

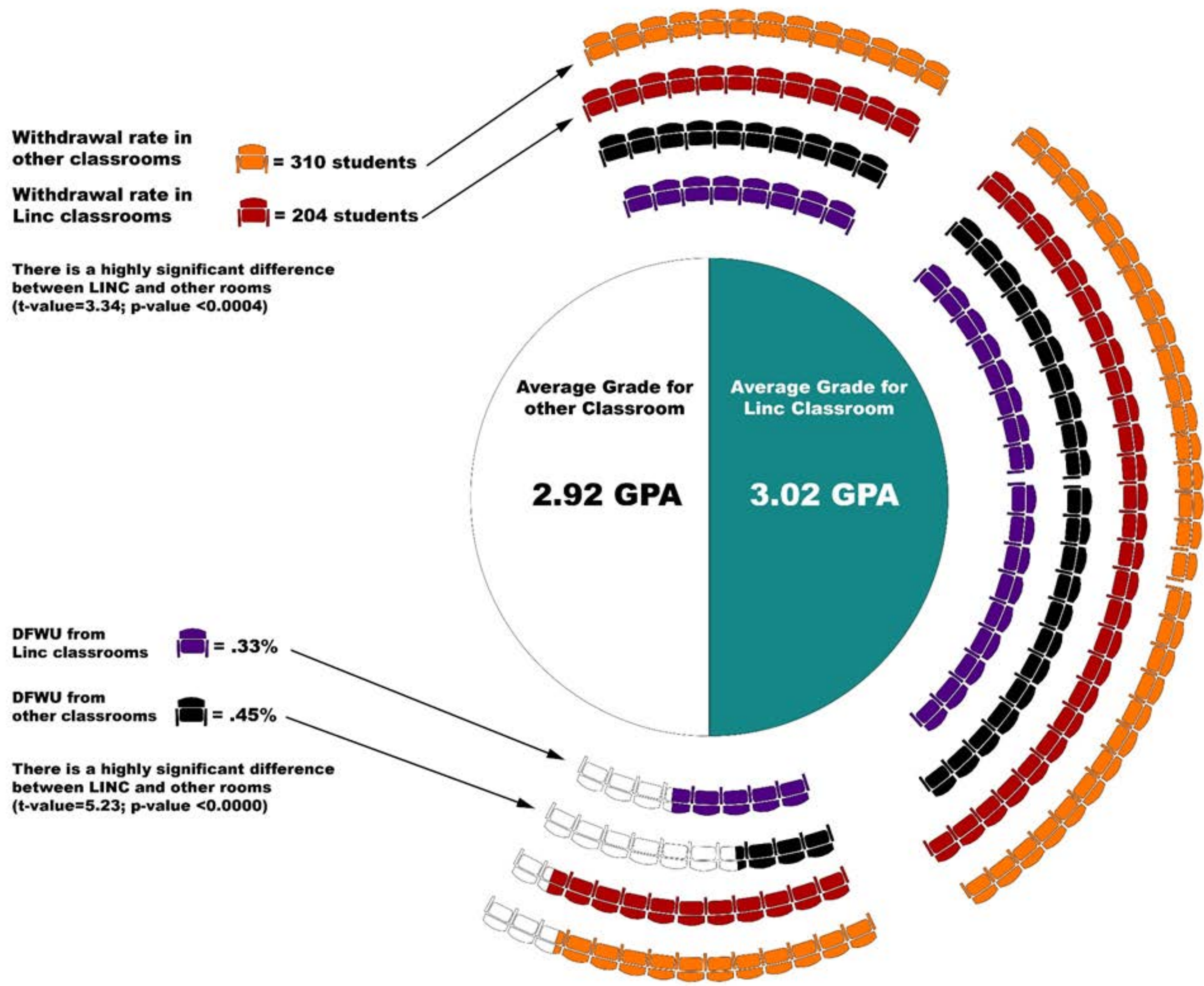


Figure 1. Comparison of Linc classrooms and other classrooms. The figure shows that Linc classrooms have a higher average grade (3.02 GPA) compared to other classrooms (2.92 GPA). Additionally, Linc classrooms have a lower withdrawal rate (204 students) compared to other classrooms (310 students). The difference in average grade is highly significant (t-value=3.34; p-value <0.0004). The difference in withdrawal rate is also highly significant (t-value=5.23; p-value <0.0000).

## The Geometry of Learning: *Tales from the learning circle*: Executive Summary

**What is it?** Tales from the learning circle is a research project designed to collect qualitative data from instructors who have taught in the LINC classrooms-in-the-round (LINC 100, 200, 228). This study is part of our comprehensive research agenda, *The Geometry of Learning*.

**What is the purpose?** The primary objective of this project is to discover themes related to teaching-in-the-round in order to provide material for teacher preparation and to report as findings about these unique classrooms as learning spaces.

**What is the focus of study?** Our primary research question is: What is the impact of learning space conditions on instructor's concept, practice, and assessment in teaching?

**Why does it matter?** Teacher preparation is a major factor in student experience and teaching-in-the-round is an unprecedented challenge in higher education. Organizing descriptions and advice from experienced instructors will be a valuable preparatory aid. Analysis of this data provides OSU a basis for assessing what does and does not work in those learning environments.

**What is being measured?** We will measure descriptive and prescriptive responses from instructors based on their experiences of teaching-in-the-round.

**How is it being accomplished?** Qualitative methods (IRB approved) including structured interviews, focus groups, and surveys will be conducted among instructors who have taught-in-the-round. Qualitative coding and analytics will be employed to develop results.



# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

Teaching Metaphors

Physicality of Teaching

The Senses

Technology

Language of Movement

Limits

Teaching Strategies

Student Behavior



# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

## **Instructor Values and Teaching Philosophy**

Teaching Metaphors

Physicality of Teaching

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Teaching Strategies

Student Behavior

*"dynamic"*

*"intimate"*

*"engaged"*

*"connected"*

*"community"*

*"personal"*

# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

## Teaching Metaphors

Physicality of Teaching

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Student Behavior

*"role model"*

*"dancer"*

*"DJ"*

*"performer"*

*"in-sync"*

*"participant"*

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Semi-Structured Interviews (2017-2020)

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Teaching Strategies

Student Behavior

*"action"*

*"motion"*

*"proximity"*

*"hiding"*

*"moving with the students"*

# The Geometry of Learning: *Tales from the Learning Circle*

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## **The Senses**

Technology

Language of Movement

Limits

Teaching Strategies

Student Behavior

*"student voices"*

*"acoustics"*

*"visual"*

*"eyes"*

*"seeing"*

*"showing"*

*"in touch"*

*"feeling the space"*

# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

*"dual projection"*

Teaching Metaphors

*"animation"*

Physicality of Teaching

The Senses

*"wide aspect ratio"*

*"audio system"*

**Technology**

Language of Movement

Limits

*"untethered"*

Teaching Strategies

*"lighting control"*

Student Behavior

*"demonstration"*

*"audience response system"*

# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

*"circulate"*

Teaching Metaphors

*"rotate"*

Physicality of Teaching

*"swivel"*

The Senses

*"peripatetic"*

Technology

## **Language of Movement**

Limits

*"circumambulation"*

*"surround"*

Teaching Strategies

Student Behavior

*"immersed"*

*"dizzy"*

# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

*"exams are hard to administer"*

Teaching Metaphors

Physicality of Teaching

The Senses

*"laser pointers don't work"*

Technology

Language of Movement

## **Limits**

*"handouts and collections are awkward"*

Teaching Strategies

Student Behavior

# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

Instructor Values and Teaching Philosophy

Teaching Metaphors

Physicality of Teaching

The Senses

Technology

Language of Movement

Limits

**Teaching Strategies**

Student Behavior

*"added guest speakers"*

*"no significant change"*

*"sections"*

*"zones"*

*"pie slices"*

*"wheel spokes"*

*"individual engagement"*





# The Geometry of Learning: *Tales from the Learning Circle*

Semi-Structured Interviews (2017-2020)

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Teaching Strategies

Student Behavior

*"disruptive comments have ceased"*

*"learner seat preference has changed" (maybe)*

"Eyes on the Street"



# "Eyes in the Seats"

Jane Jacobs, *The Death and Life of Great American Cities* (1961)

"The trust of a city street is formed over time from many, many little public sidewalk contacts... Most of it is ostensibly utterly trivial but the sum is not trivial at all. The sum of such casual, public contact at a local level - most of it fortuitous, most of it associated with errands, all of it metered by the person concerned and not thrust upon him by anyone - is a feeling for the public identity of people, a web of public respect and trust, and a resource in time of personal or neighborhood need. The absence of this trust is a disaster to a city street. Its cultivation cannot be institutionalized. **And above all, it implies no private commitments.**" (p. 56)

THE DEATH  
AND LIFE  
OF GREAT  
AMERICAN  
CITIES

JANE JACOBS

LEARNING INNOVATION CENTER (LINC)



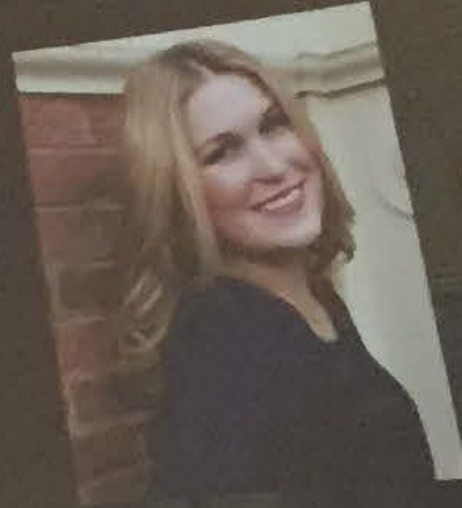
**CASSANDRA HUBER**  
PRESIDENT  
ASSOCIATED STUDENTS OF  
OREGON STATE UNIVERSITY



LEARNING INNOVATION CENTER (LINC)



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PRESIDENT  
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(LINC)



# The Growth of Learning-in-the-Round Spaces



# WSU SPARK FALL 2017



# Research: The Geometry of Learning

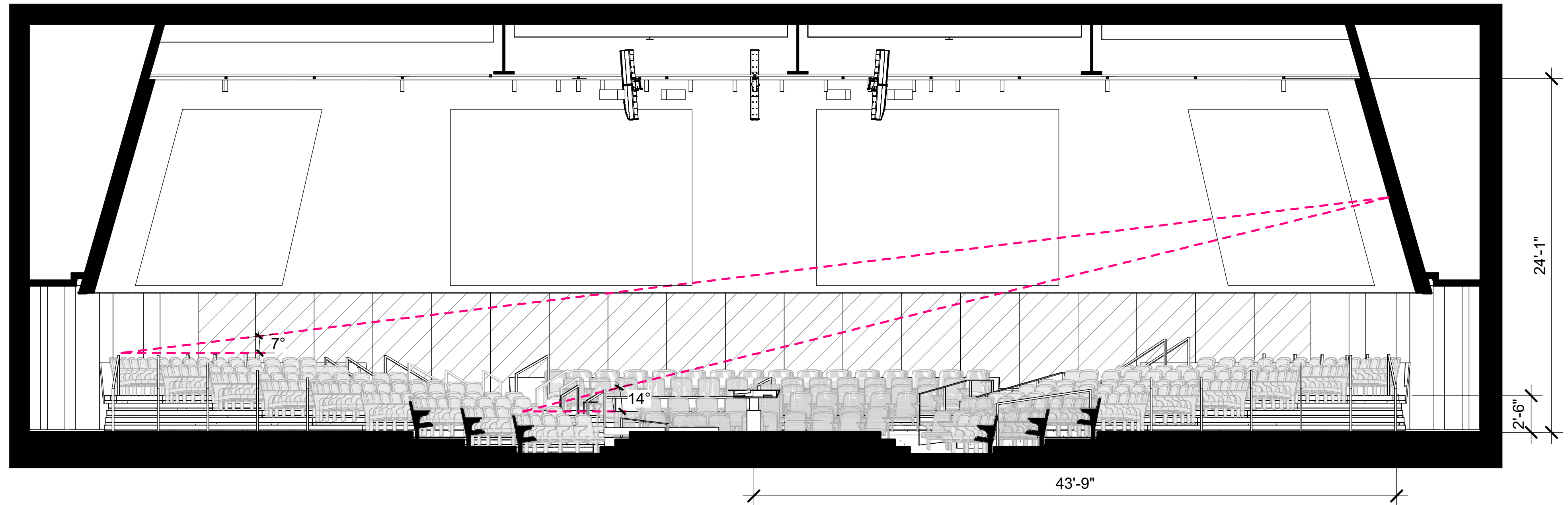
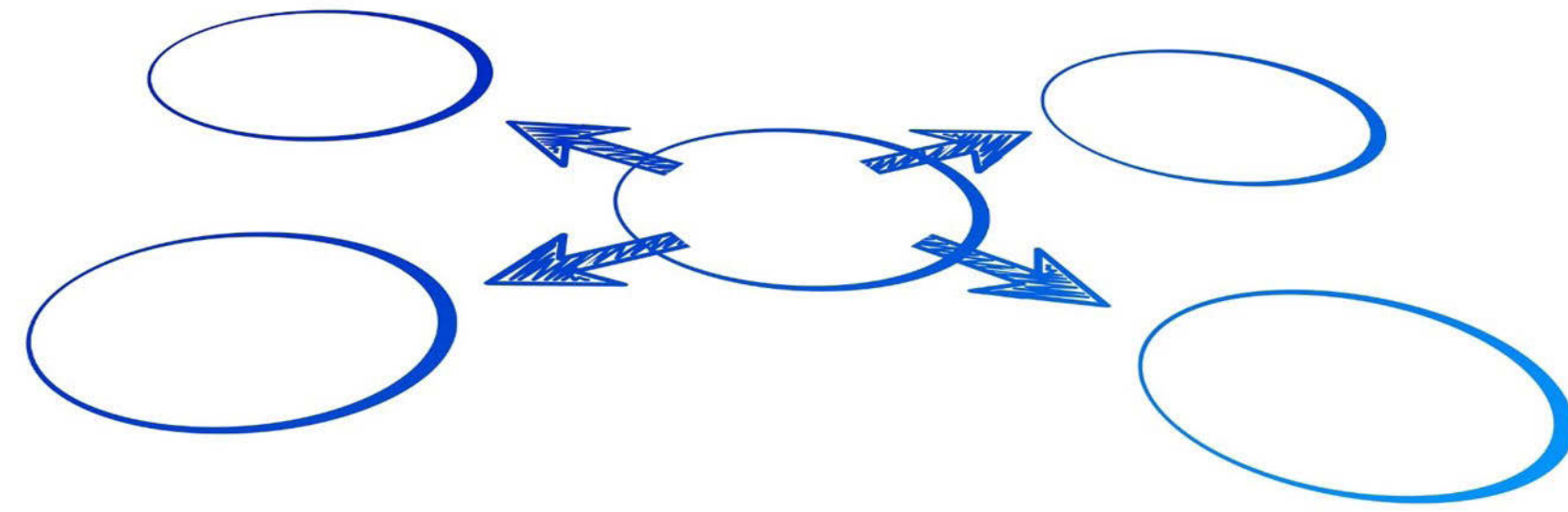
## Next Steps

- Publish Ongoing Studies
- Launch Student Survey
- Launch Observational Study
- Launch Pre-Facility Attitudinal Study
- Teaching-in-the-Round Conference
  - Julie Johnstone (Indiana U, Educause)

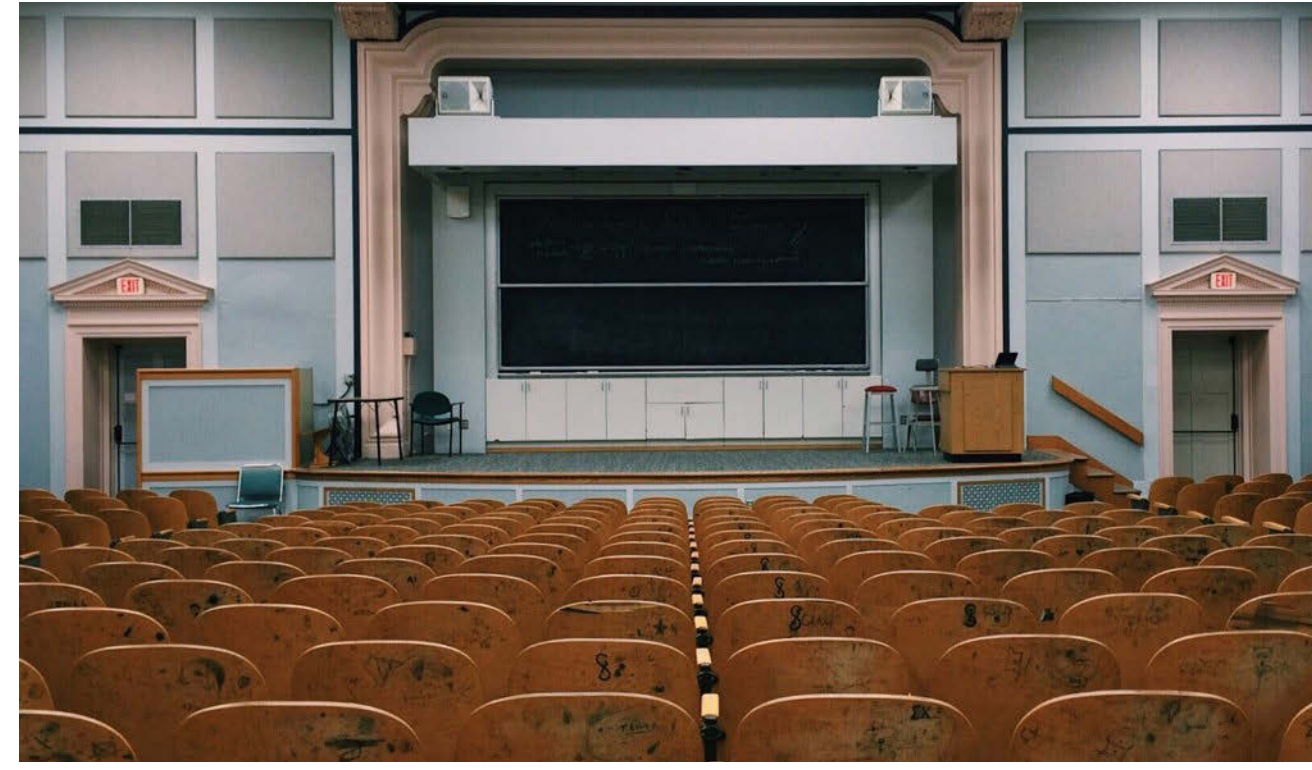


# Teaching in the Round: A Faculty Perspective

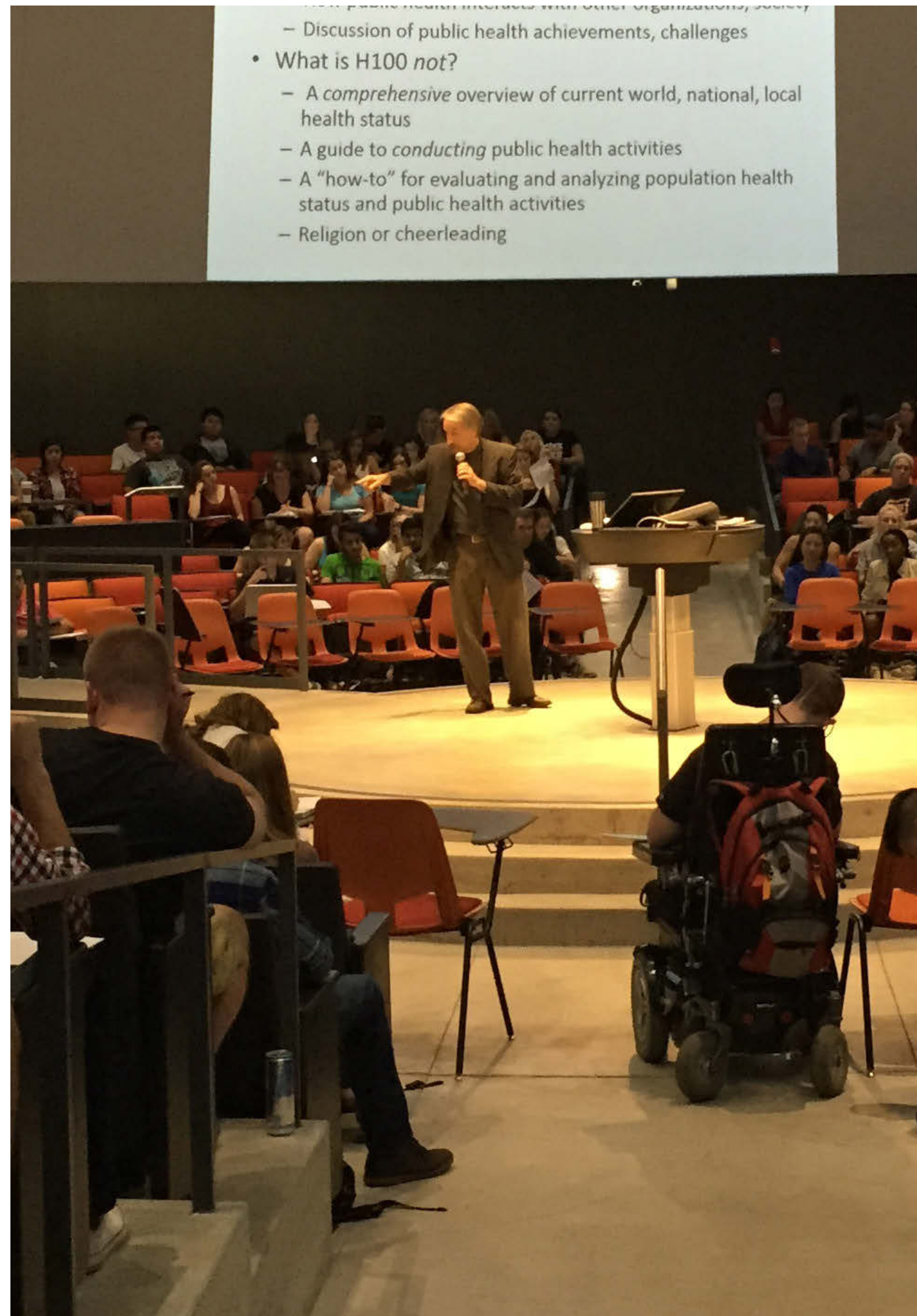
# Connection With/To Students



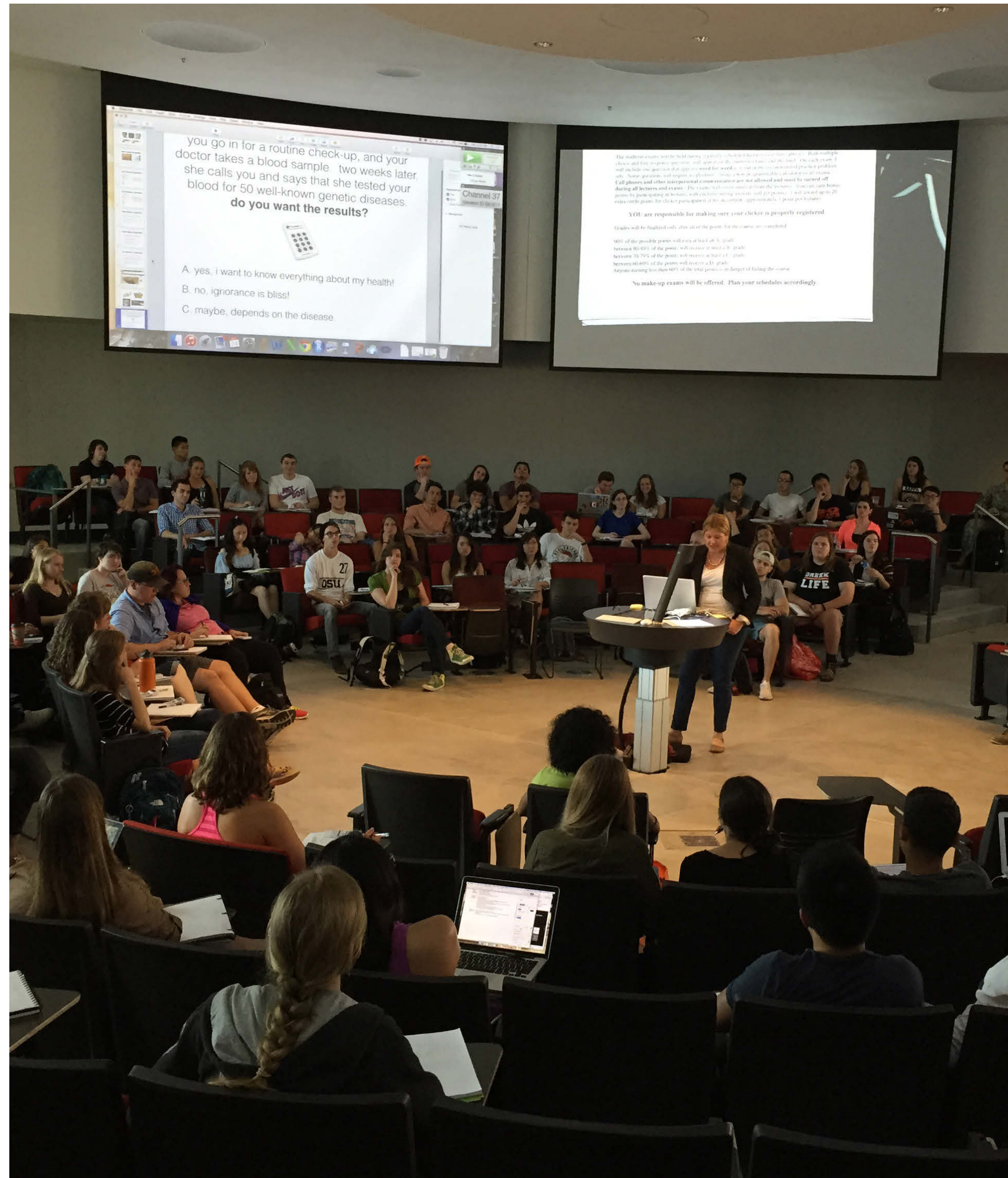
# Gradual Usage at First



# Effects of Acoustics and Sounds on Environment



# Involvement of Students in the Learning Environment



Discussion (write as much as you want): What was something that you found interesting about the statistics on Mental health?

Reply

Ordered by New

Submissions Closed

How would you describe yourself in terms of mental health?

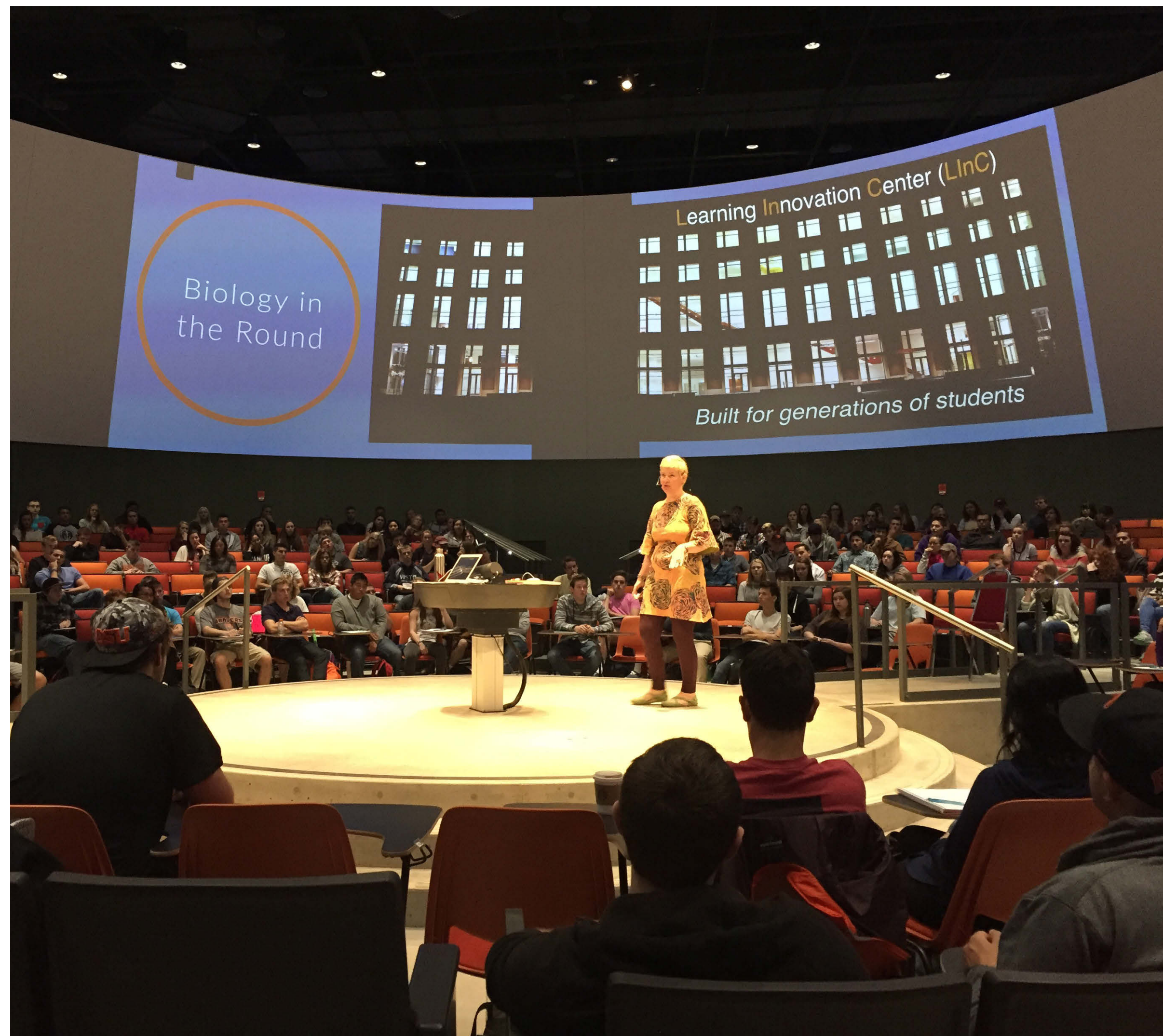
A I'm struggling.	14%
B I periodically have episodes of anxiety or depression.	35%
C I have consistent episodes of mental health issues.	9%
D I have mental health issues and am working on it.	17%
E I do okay most of the time.	45%
F I have never been affected by mental health issues.	4%
G I have never been personally affected by mental health issues but know people who are.	14%
H My stress levels are really high.	30%
I I'm doing well mentally	27%
J Other	5%

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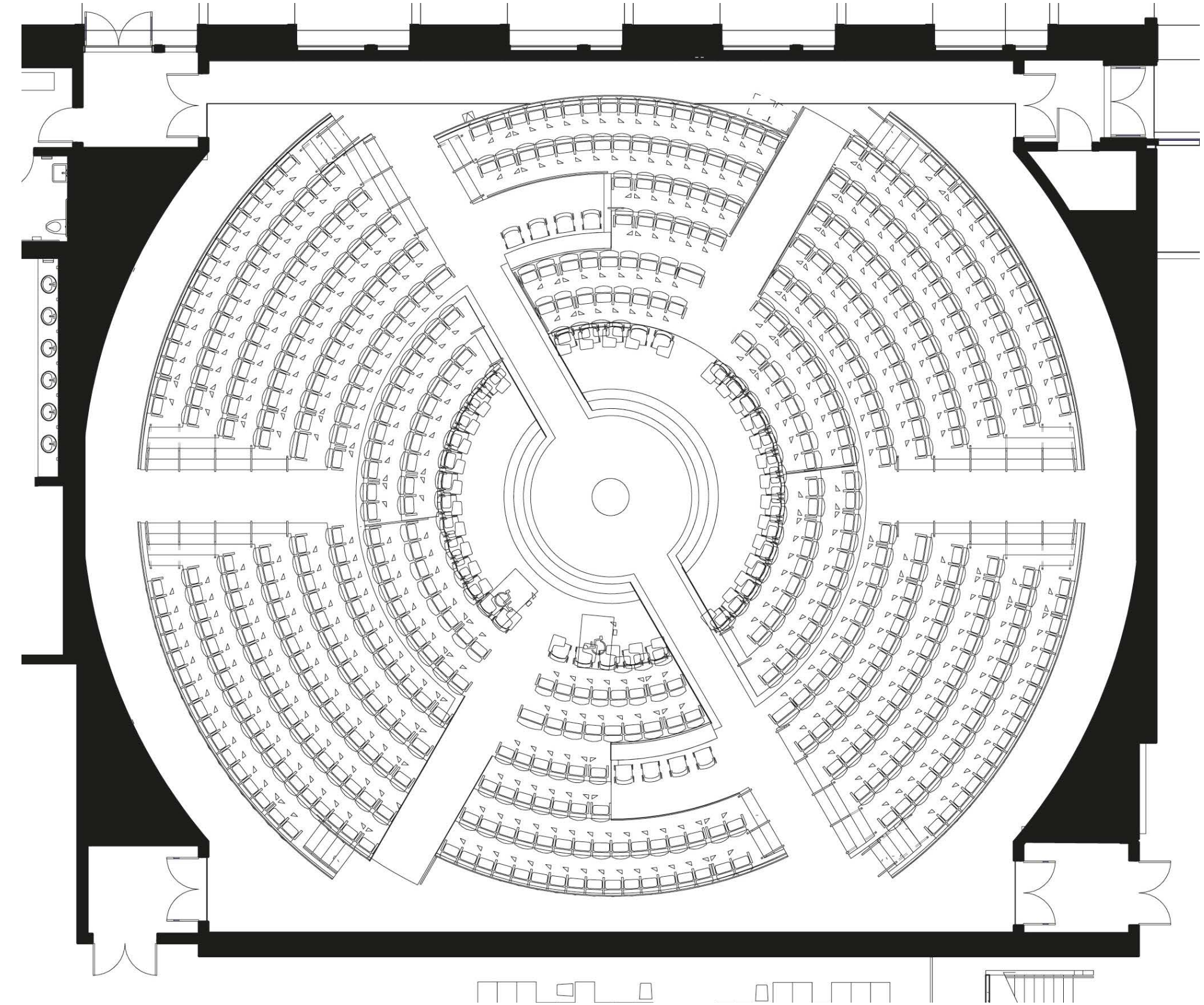
372

372

# Change is Difficult...But Not Impossible



# Familiarity with Space and Technology



# Increased Mobility of Faculty





lysosomes  
Channel 31  
Session ID thirtyone  
Module 3.6

- Golgi Apparatus, transport vesicles & lysosomes
- Golgi: repackaging
  - Transport vesicles:
    - Secretory vesicles
    - Membrane renewal vesicles
  - Lysosomes: digestive enzymes



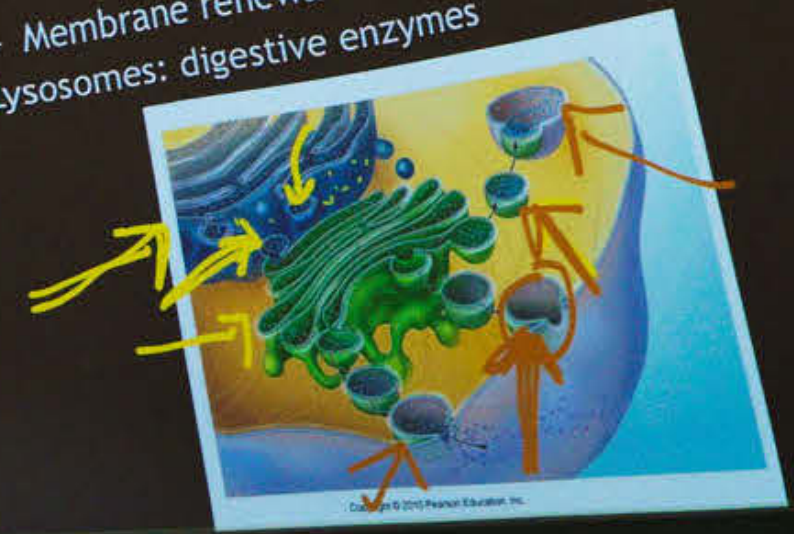
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Module 3.6

Dr. Erica Woekel  
Assistant Clinical Professor  
College of Public Health and Human Sciences  
Oregon State University  
Erica.Woekel@oregonstate.edu

Lessons Learned: Next Generation  
Teaching Environments at Texas A&M

# THE ACADEMIC UNION





# Texas A&M: 21st Century Classroom Building





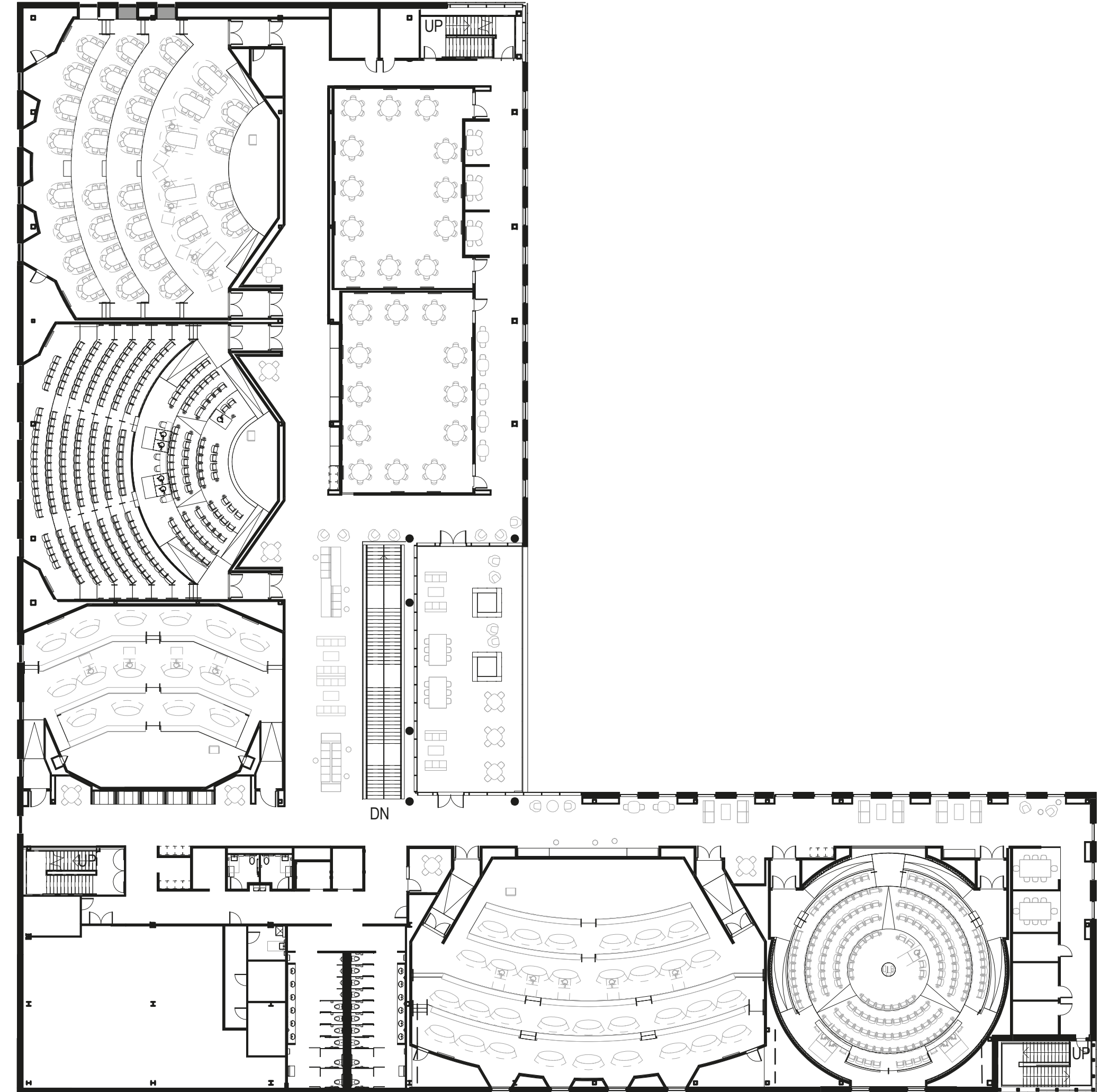
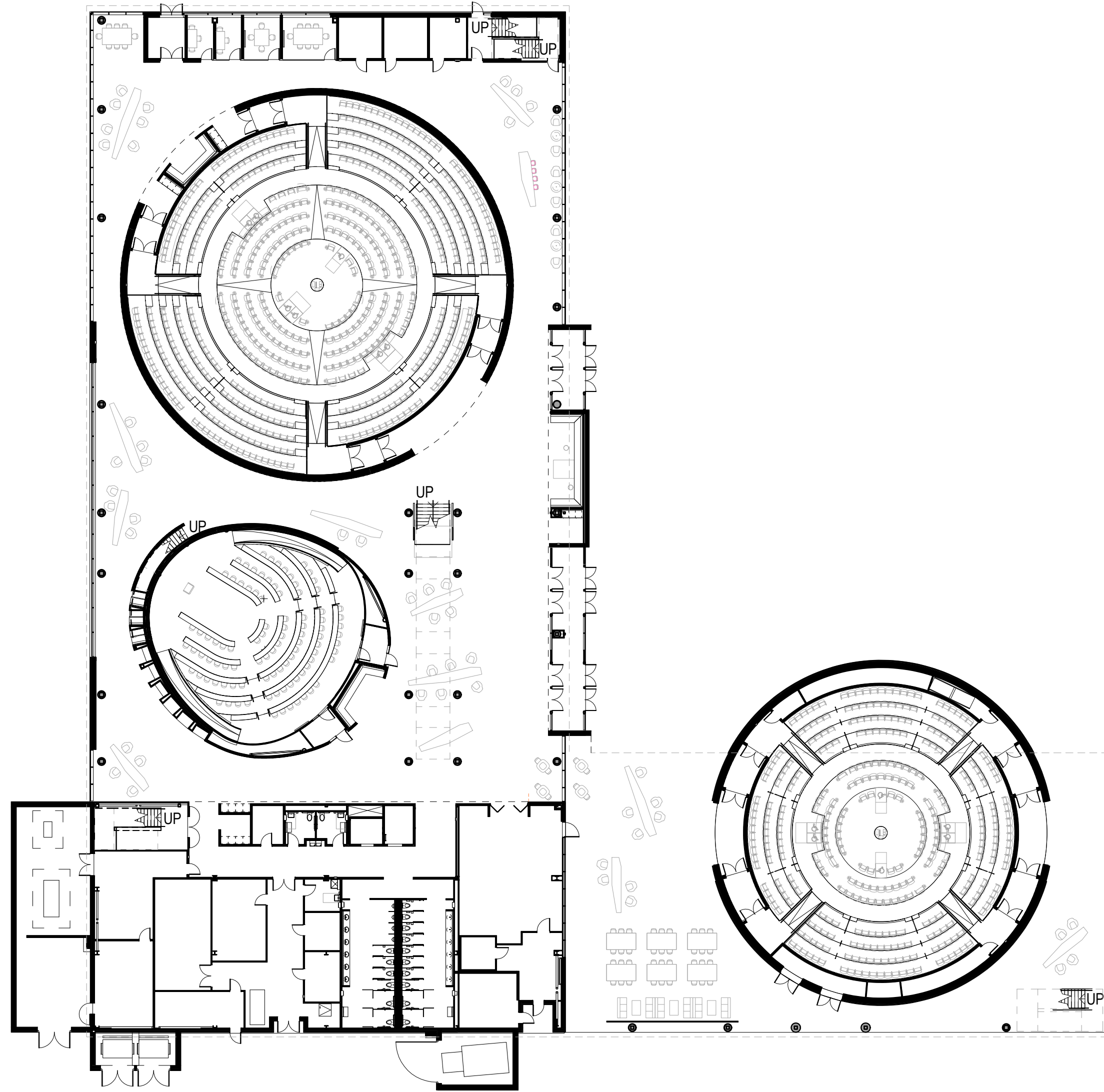


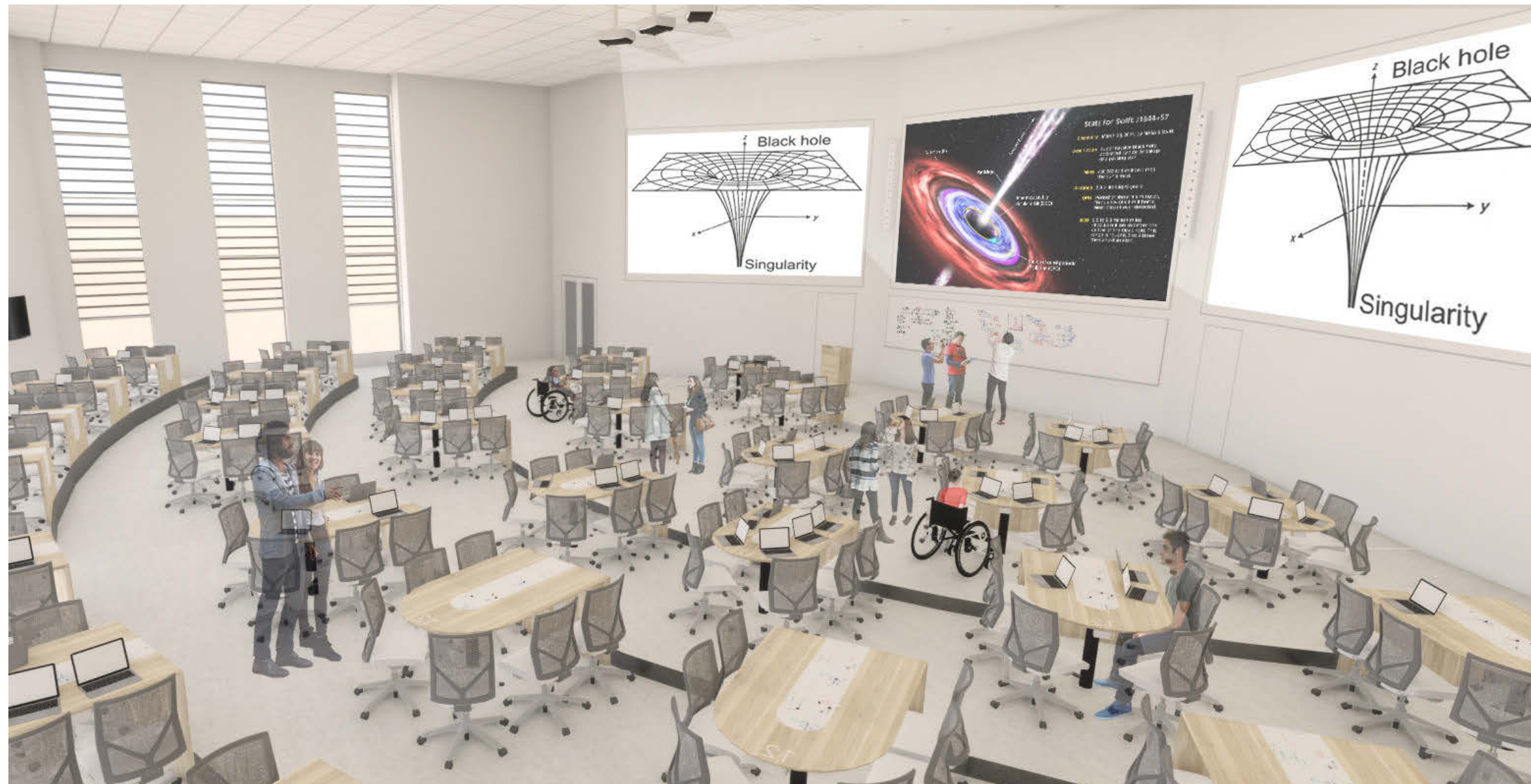






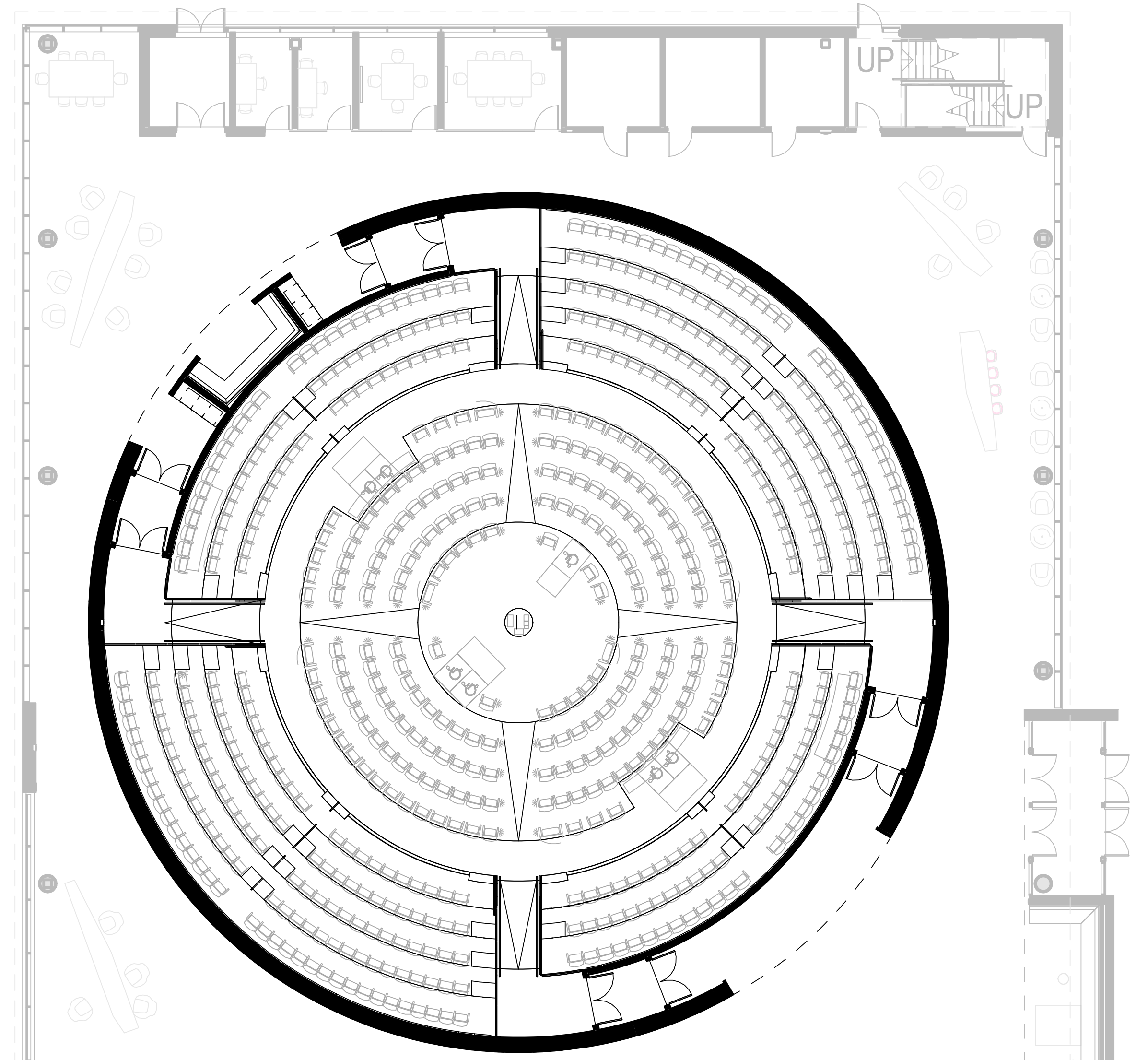
# Texas A&M: 21st Century Classroom Building

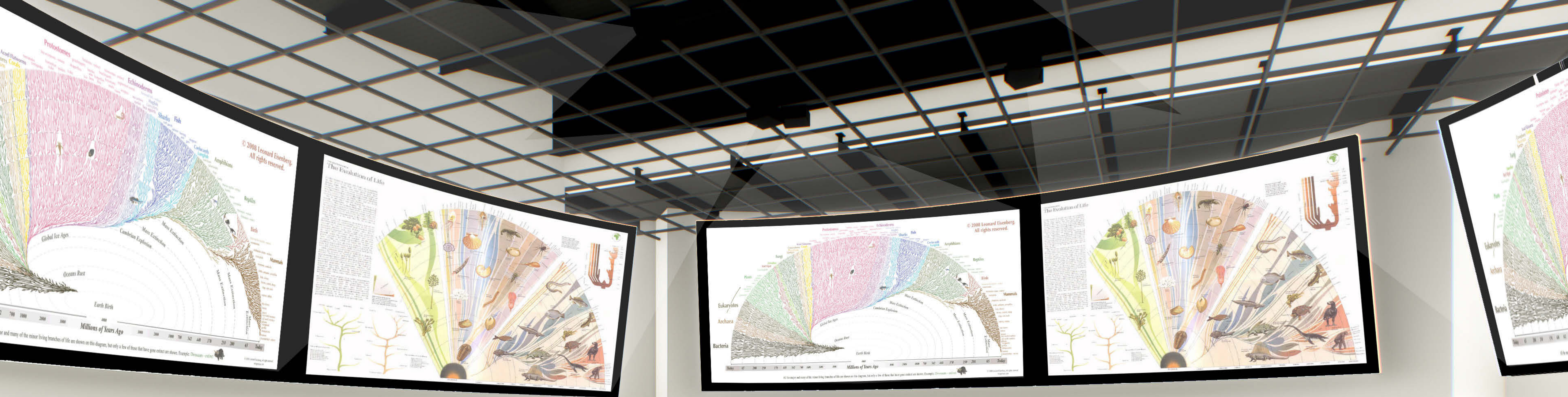


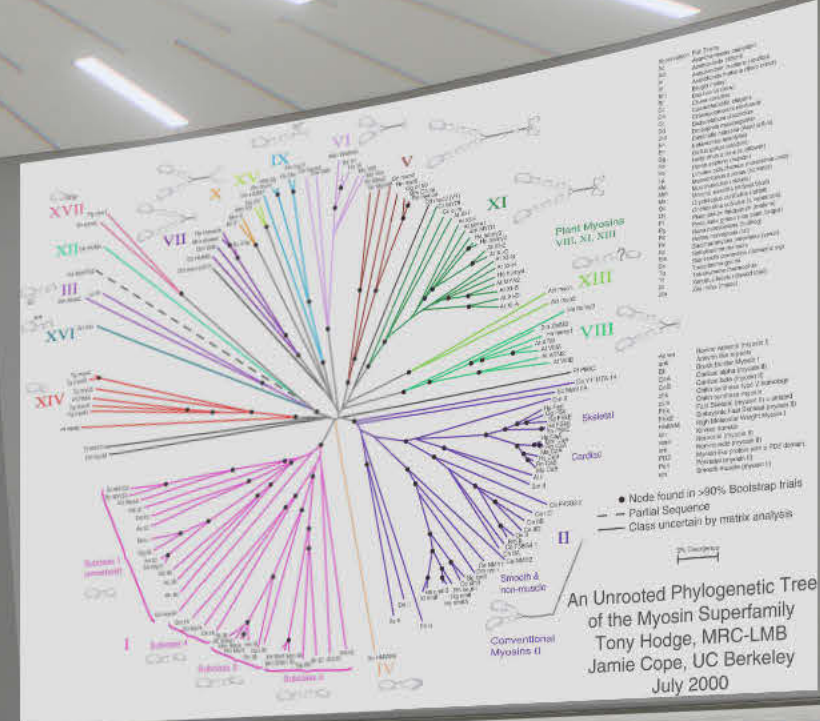
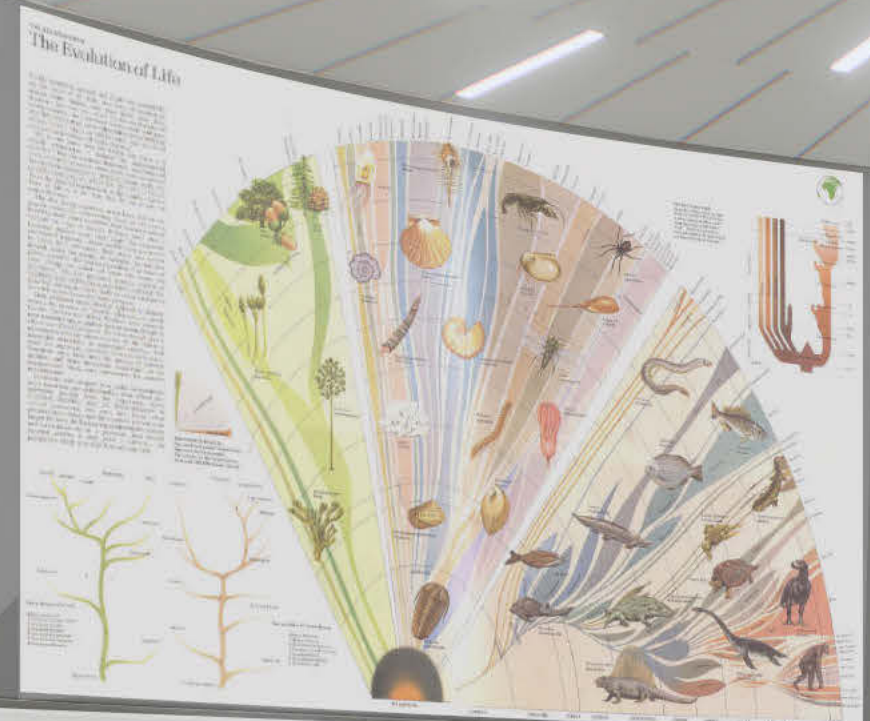
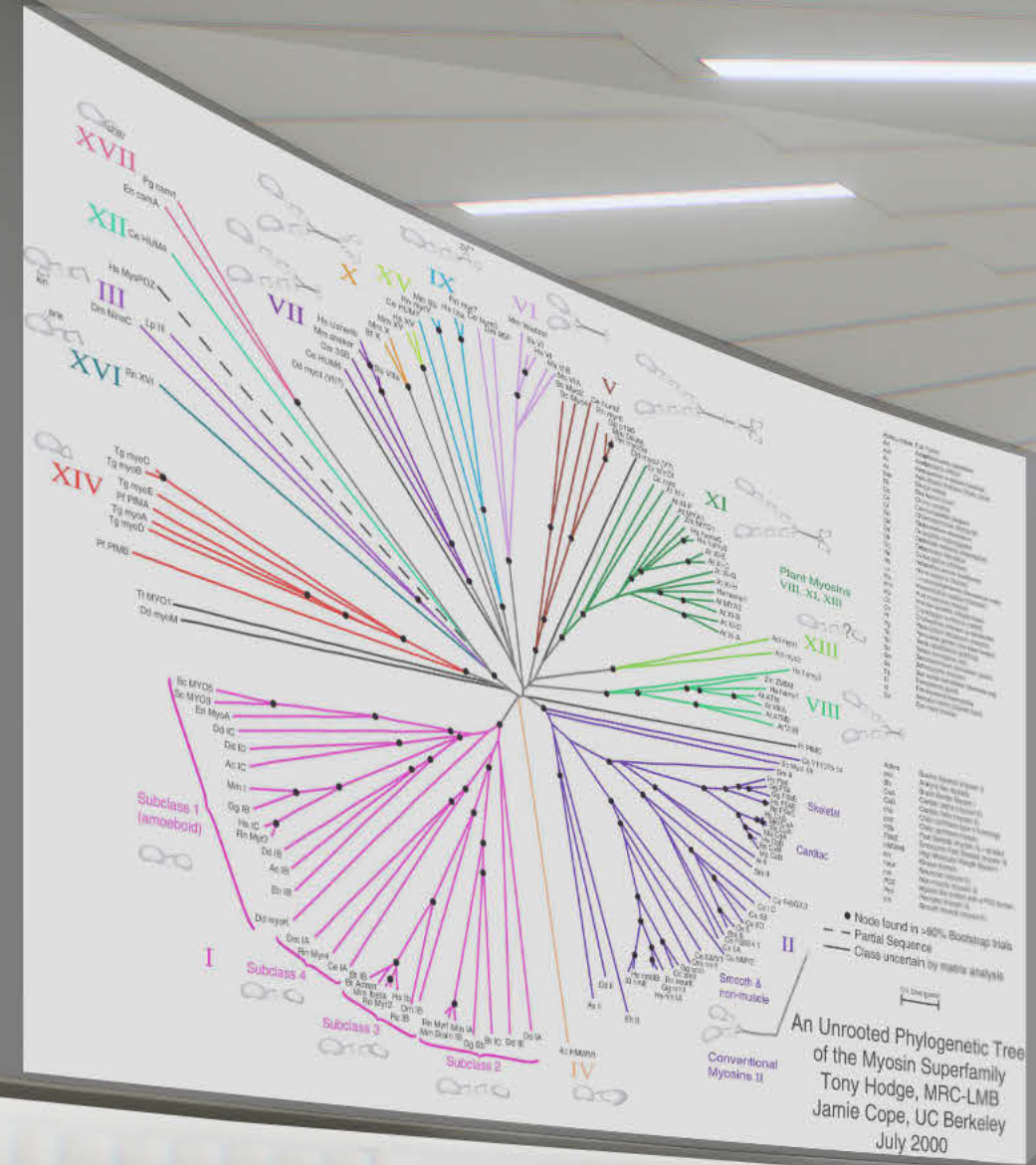




# 600-seat Arena Classroom





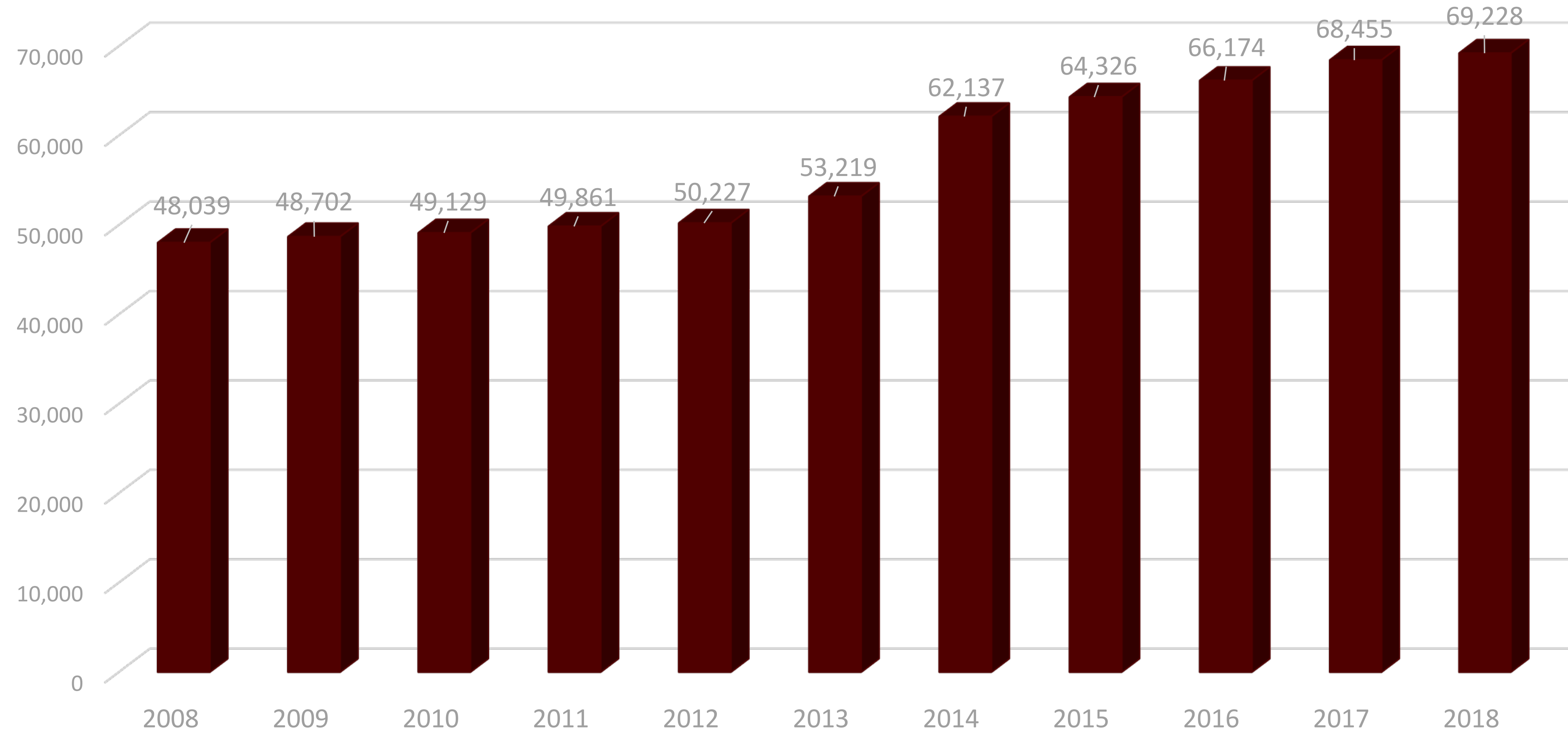


# Preparing for the 21st Century Classroom Building



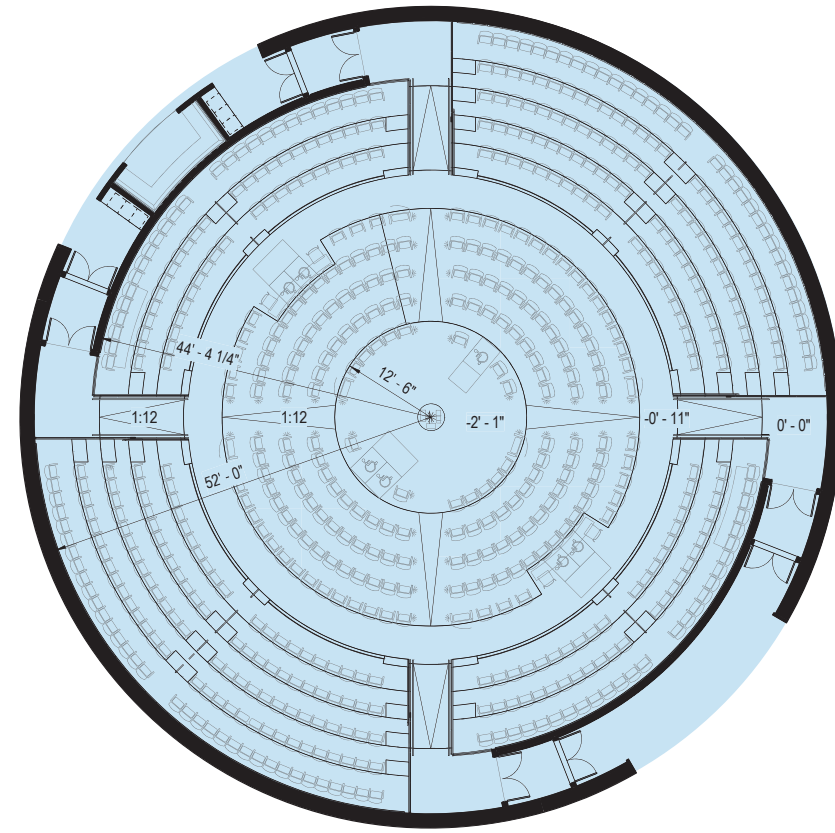


# 10 Year Enrollment Trend

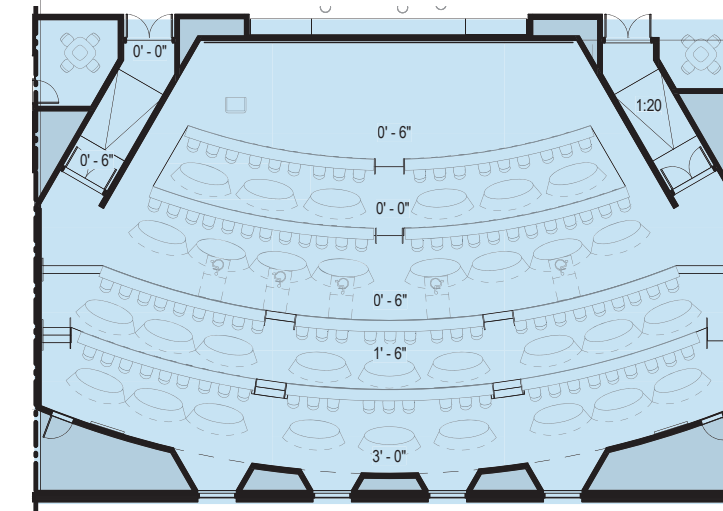


# CLASSROOMS

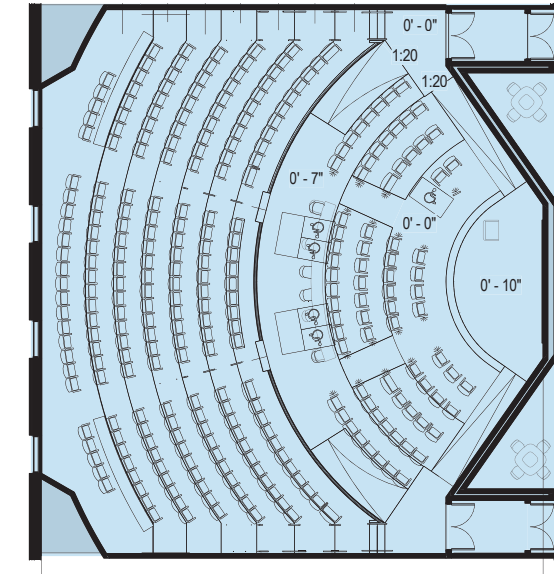
Large Arena 631 seats



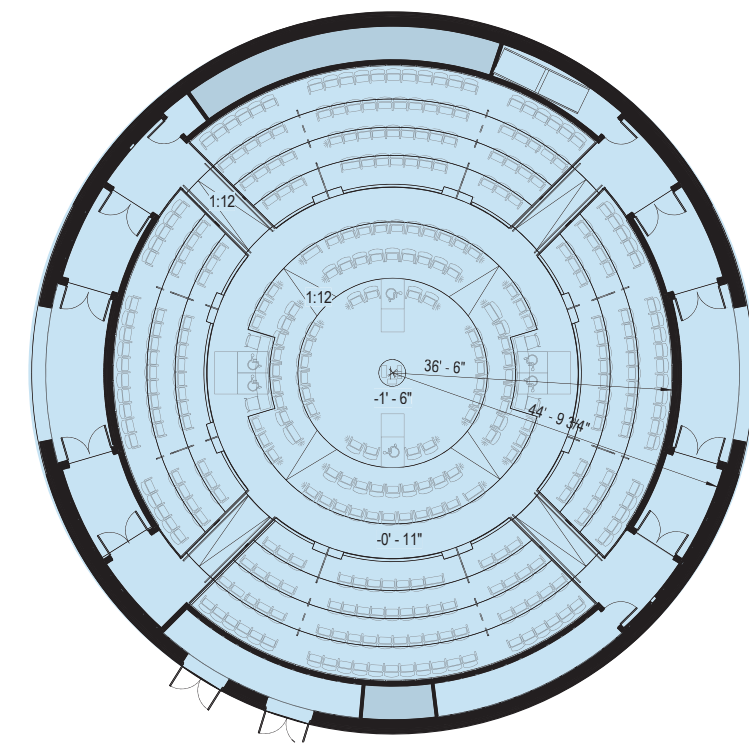
LARGE TIERED COLLAB 192 seats



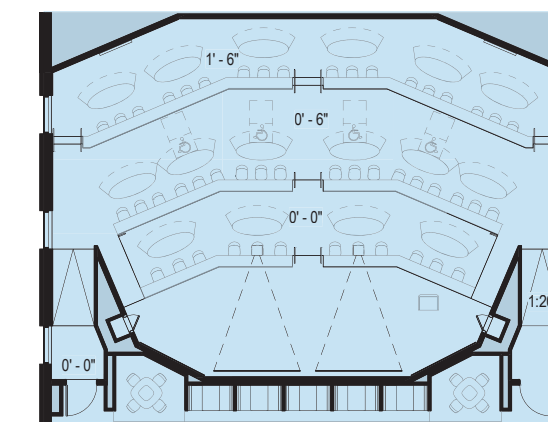
FAN LECTURE HALL 299 seats



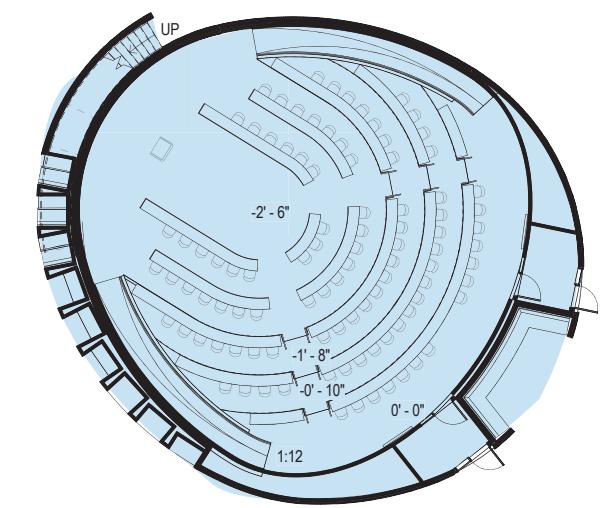
Medium Arena 346 seats



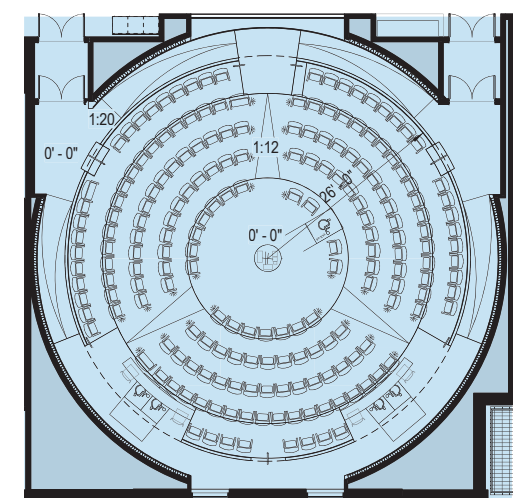
SMALL TIERED COLLAB 96 seats



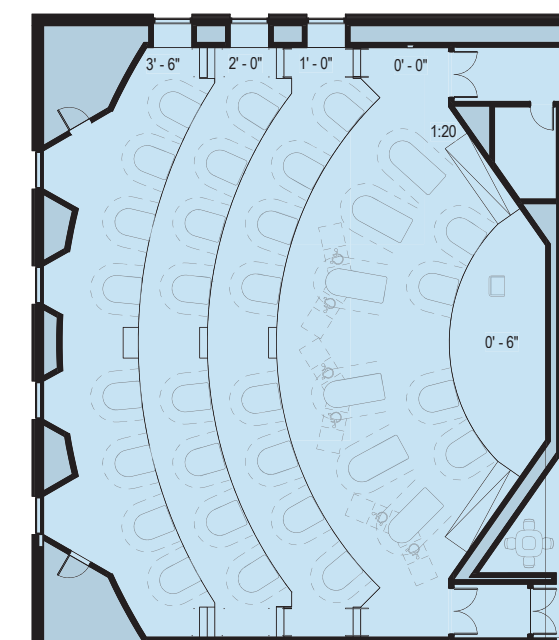
EGG CLASSROOM 96 seats



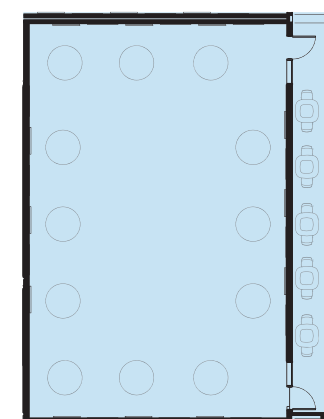
SMALL ARENA 204 seats



TIERED LEARNING STUDIO 204 seats



LEARNING STUDIO (2) 72 seats each



# Current Progress



## TEACH IN THE 21ST CENTURY CLASSROOM BUILDING (21CCB)



### Why an Invitation and Not a Call for Proposals?

*Why are you calling it an invitation? Isn't it basically a call for proposals?*

Yes, basically it is a call for proposals with a twist! The twist is that this opportunity is open to everyone—you do not have to be an experienced active learning specialist. You do not need prior experience or even an idea about how to "teach in the round" in one of the new arena classrooms. All you need is the desire to teach in the new 21CCB! We invite you to try, and we will help you achieve this goal.

Sign up, tell us a little about your course, select the room(s) in which you envision yourself teaching, explain how you see your course aligning with the new space, and let the 21CCB taskforce handle the rest. Faculty development will be offered early, often, and ongoing. Together we will succeed in making the 21CCB your new teaching home and way of life.

### To complete the Invitation to Teach in the 21CCB, you will need:

- Course syllabus (with learning outcomes)
- Nomination letter from your Associate Department Head indicating a departmental agreement that the course will be taught in the 21CCB and listing the instructor(s) teaching the course
- For any multi-section courses, you must know the names of all instructors teaching, their titles, email addresses, and the number of sections they will teach
- View the [21CCB Sliddeck](#) (PDF) for room selection options

# Opportunities for Joint Institutional Research





Questions?