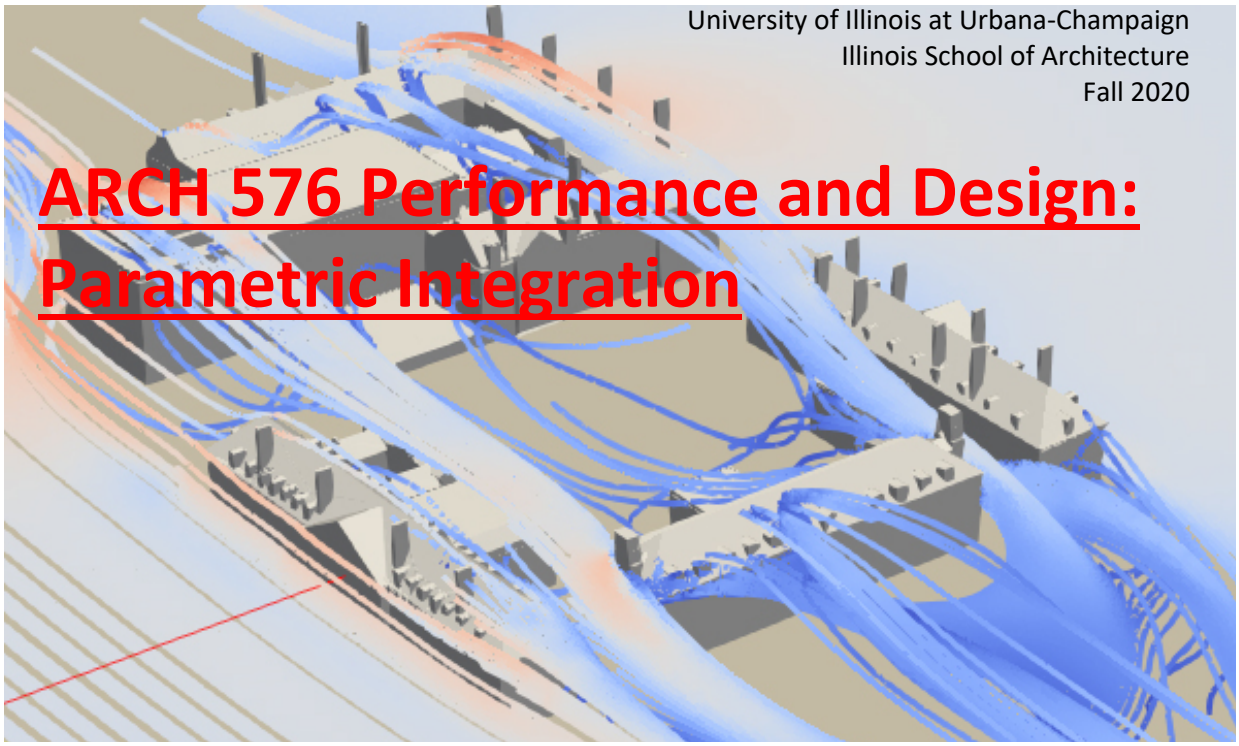

University of Illinois at Urbana-Champaign
Illinois School of Architecture
Fall 2020

ARCH 576 Performance and Design: Parametric Integration

Instructors: ***Yun Kyu*** **Yi**, Ph.D., Assistant Professor
Email Address: ykyi@illinois.edu

Credit: 3 credits

Class: Mondays 9:00 AM - 11:45 AM CT, Zoom

Drop-in hours: Monday, 11:45 AM – 12:45 AM, Zoom

On-line LMP: **Commpass2g** will be platform for communication with additional support from ConceptBoard and Box.

1. COURSE INFORMATION

This course develops techniques for integrating environmental performance analysis and the design of buildings, with an emphasis on parametric methods. Performance analysis techniques can provide enormous amounts of information to support the design process, acting as feedback mechanisms for improved performance, but careful interpretation and implementation are required to achieve better buildings. Parametric descriptions will be combined with decision-making methods to achieve more complete integration.

Students will begin by using analytical tools to examine the environmental performance of existing buildings. Following the results of the analysis, the students will develop high-performance goals and use analytical tools to develop an initial design proposal. Different decision-making and parametric form control methods will then be introduced to achieve high performance designs.

State-of-the-art computer models for building simulation will be introduced. This will provide students with an understanding of building design simulation methods and numerical computer modeling will be introduced to support decision making. Both building simulation and decision-making model will be integrated to perform parametric design.

2. INSTRUCTIONAL METHODOLOGY

Lectures will be given on specific topics each week. A series of analysis projects will be assigned to provide students with hands-on experience in using the computer models. No computer programming background is required for this course. However, students are assumed to have a background in using geometric modeling and basic building simulation applications such as Rhino, Grasshopper, Ladybug, etc.

3. SCHEDULE

	Week	*Subject*	Software
1	**08/24**	Introduction, Course Overview	
2	**08/31**	Grasshopper (graphic programing and scripting) I	Grasshopper
3	**09/07**	***HOLIDAY***	
4	**09/14**	Grasshopper (graphic programing and scripting) II	Grasshopper
5	**09/21**	Lighting Simulation I	Grasshopper / Ladybug
6	**09/28**	Lighting Simulation II	Grasshopper / Ladybug
7	**10/05**	Energy Simulation I	Honeybee / EnergyPlus
8	**10/12**	Energy Simulation II	Honeybee / EnergyPlus
9	**10/19**	CFD (Computational Fluid Dynamics Simulation I	Eddy3d
10	**10/26**	***FALL Break***	
11	**11/02**	Decision Making I (Optimization, Genetic Algorithm)	Galapagos
12	**11/09**	Decision Making II (Multi-Objective Optimization / Artificial Neural Network)	Octopus
13	**11/16**	Performance driven parametric design I	Rhino/GH
14	**11/23**	Performance driven parametric design II	Rhino/GH
15	**11/30**	Office Hour	
16	**12/07**	**Final Project Presentation**	