4.550/4.570, MIT Architecture Spring 2026
Learning from Design Heritage: Research Incubation Workshop of Data-driven Methods
Instructors: Takehiko Nagakura and Guest Speakers
TA: Xiaoyun Zhang

Last update: 2026.02.05 (Subject to changes)

Weekly Schedule

Week 01	**Mon, Feb. 02**	Introduction
	+ Tue, Feb. 02	Using and analyzing image data: Scraping SNS, online crowd-sourcing
		Ex0 out: Q/A (Student selection)
		Guest Instructor: Rohit Sanatani
		Ex1 out: ==Learning through image data – image segmentation==
		Google Colab, Segment Anything Model, Google Vision API
Week 02	**Mon, Feb. 09**	Recording spatial design and measruing human response in it
	+ Tue, Feb. 10	Structure for Motion, VR and AR, Physiological sensor
		Ex1 in: In-class review and discussion
		Tutorial: TN and XZ
		Ex2 out: ==Affective Computing - VR and physiological response==
		Ex2 (part 1) Scanning a spatial design and editing its 3d representation
		Gaussian Splatting, Photogrammetry, SuperSplat
Week 03	**Mon, Feb. 16**	*Presidents Day Holiday (All Monday classes shift to Tuesday)*
	+ Tue, Feb. 17	**Ex 2 (part 1) in:** In-class review and discussion
		Tutorial: TN and XZ
		Ex2 (part 2): [in-class hands-on session]
		Meta Quest HMD**,** EEG/GSR, eye-tracking, Unity 3D
Week 04	**Mon, Feb. 23**	Pipeline tooling for online research – visual workflow editor
	+ Tue, Feb. 24	Mechanical Turk, RAG, dynamic website with LAMP
		Ex2 in: In-class review and discussion
		Tutorial: XZ
		Ex3 out: ==Designing a pipeline with subject-based test and ML model==
		Google Opal, LLM API call tools for Rhino/Blender/Unity 3D

~~Week 04~~ ~~Mon, Feb. 23~~ ~~Using videos: motion tracking/segmentation, panoramic projection~~
~~+ Tue, Feb. 24~~ ~~Ethnography of heritage places, pedestrian simulation~~
~~Ex2 in:~~ ~~In-class review and discussion~~
~~Tutorial: XZ~~
~~Ex4 out:~~ ~~==Analysis from video recordings – gesture recognition==~~

Week 05	**Mon, Mar. 02**	Finding patterns through Machine Learning
	+ Tue, Mar. 03	Spatial layout, sketches, photos
		Ex3 in: In-class review and discussion
		Guest Instructor: XZ + Woongki Sung
		Ex4 out: ==Finding and generating patterns by machine learning==
		GAN (pix2pix), One-shot/zero-shot learning, Stable Diffusion
Week 06	**Mon, Mar. 09**	Examining literature on spatial designs

	+ Tue, Mar. 10	Natural language processing, sentiment study of heritage places
		Ex4 in: In-class review and discussion
		Instructor: DT
		Ex5 out: <mark>Design Analysis through text</mark>
Week 07	**Mon, Mar. 16**	**Ex5 in:** In-class review and discussion
		Final project guideline (Title, idea, method, deliverable, resource)
		[in-class session] **Brainstorming: Final project topic and method**
	+ Tue, Mar. 17	Workshop/ desk critique by sign-up

Week 08	***Mar. 23 – Mar. 27***	***MIT Spring Break***

Week 09	**Mon, Mar. 30**	**Presentation: Final project proposal + initial progress**
	+ Tue, Mar. 31	Tutorial: Training Image Segmentation (Yolo 11)
		Lab: desk critic by sign-up
Week 10	**Mon, Apr. 06**	Human-subject study in cognitive psychology, COUHES, gamification
	+ Tue, Apr. 07	Guest talks: Daniel Tsai + Xiaoyun Zhang
		on Analysis of Palladio's Four Books using NLP
		Tutorial: Customizing Multi-modal network (Yolo-world)
		Lab: desk critic by sign-up
Week 11	**Mon, Apr. 13**	**Interim review: Final project**
	+ Tue, Apr. 14	**Lab**: desk critic by sign-up
Week 11	***Mon, Apr. 20***	***Patriots Day Holiday***
	+ Tue, Apr. 21	No class
Week 13	**Mon, Apr. 27**	(Data-driven) AI tools for design generation
	+ Tue, Apr. 28	Guest talks: Rohit Sanatani + TBA (Taro/Nik/Tracy)
		on Analysis of Urban Data Matrix by Deploying Analogy
		Lab: desk critic by sign-up
Week 14	**Mon, May 04**	Cultural heritage practice for preservation and online/museum exhibition
	+ Tue, May 05	Guest talks: TN + Woongki Sung
		on Generation of Architectural Site Plan through Bayesian Network
		Lab: desk critic by sign-up
Week 15	**Mon, May 11**	**Final presentation**
		* Submit your presentation package ready for online archive (ppt/pdf)
	Tue, May 12	Reserved for backup *(MIT Last day of class)*
	May 16-21	*MIT Final Exam period*
	May 22	*MIT Grade deadline*
	May 27-29	*MIT Commencement*

Guest of PAST semester

Guest talk: Nikolaus Vlavianos on Analysis of Spiritual Space (HMD and GSR)