NEW MEDIA AND REPRESENTATION OF UNCONVENTIONAL ARCHITECTURAL

new media thesis:: yumih chang

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF FINE ARTS

NEW MEDIA AND REPRESENTATION OF UNCONVENTIONAL ARCHITECTURE

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A thesis
submitted in partial fulfillment
of the requirements
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Honors Adviser

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NEW MEDIA AND REPRESEN-TATION OF UNCONVENTIONAL ARCHITECTURAL

(REPRESENTATION OF KEISUKE OKA'S ARIMASU-TON-BIRU FOR NEW MEDIA AND ARCHITECTURAL STUDIES)

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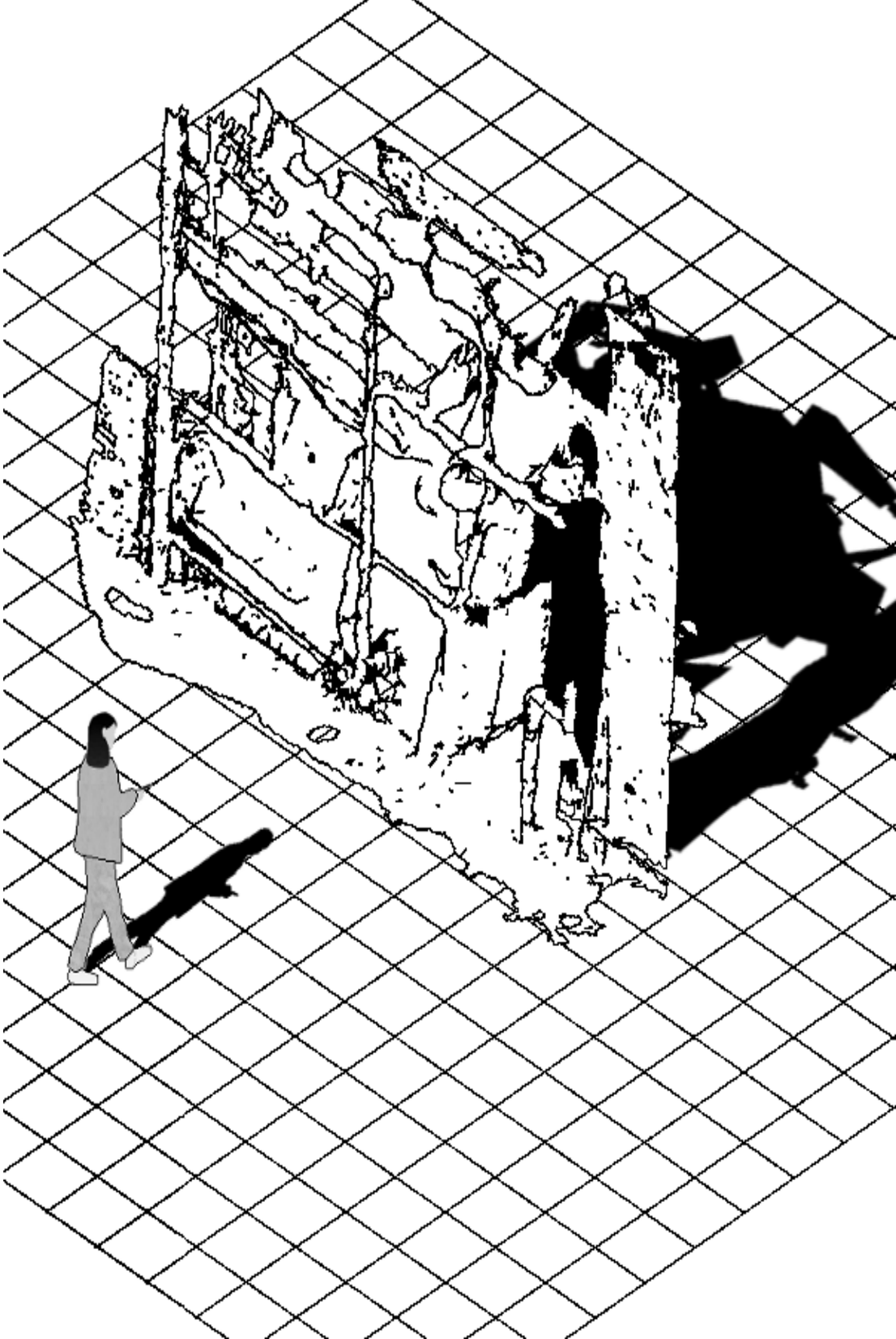
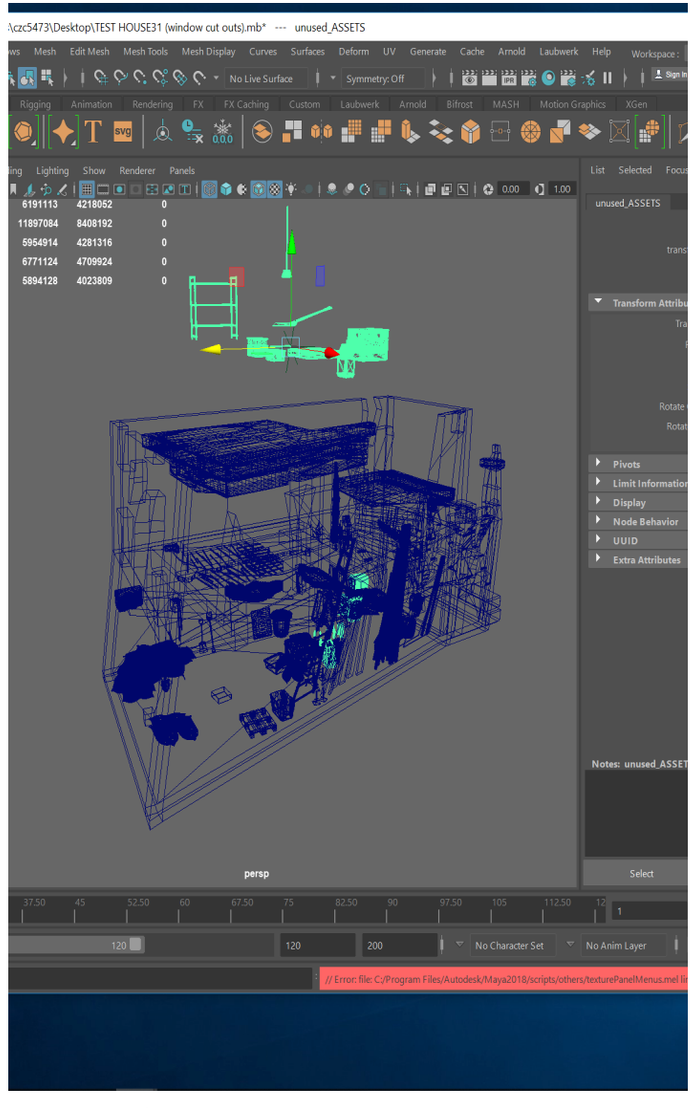
abstract_

new media__
forms of media that are native to computers, computational and relying on computers for redistribution.



new media for architectural representation

conventional representation of architecture takes place visually and at a distance. however, new media has made it possible to interpret architecture without architectural training in reading traditional plans, sections, and elevations. space, and how it is perceived has evolved. it has introduced possibilities to increase public engagement by providing an immersive context for information to be disseminated. In the 1960s, new media architectural representation began to be associated computer technologies with the CAD revolution. computer aided design programs allowed for sophisticated 2D drawing tools. in the 1980s, three dimensional modeling became possible with the introduction of BIM, building information software. now, the evolution of architectural representation has moved to the realms of VR, virtual reality, and IDE, immersive digital environments. The aim of this project was to explore and implement a curated approach to representing and disseminating architecture, specifically, unconventional architecture. during exploration of new media for this project, several mediums were used. digital art, 360 ° tour, 3D scan, and virtual reality were used to create architectural representations. these representations were then distributed online, with varying degrees of success.



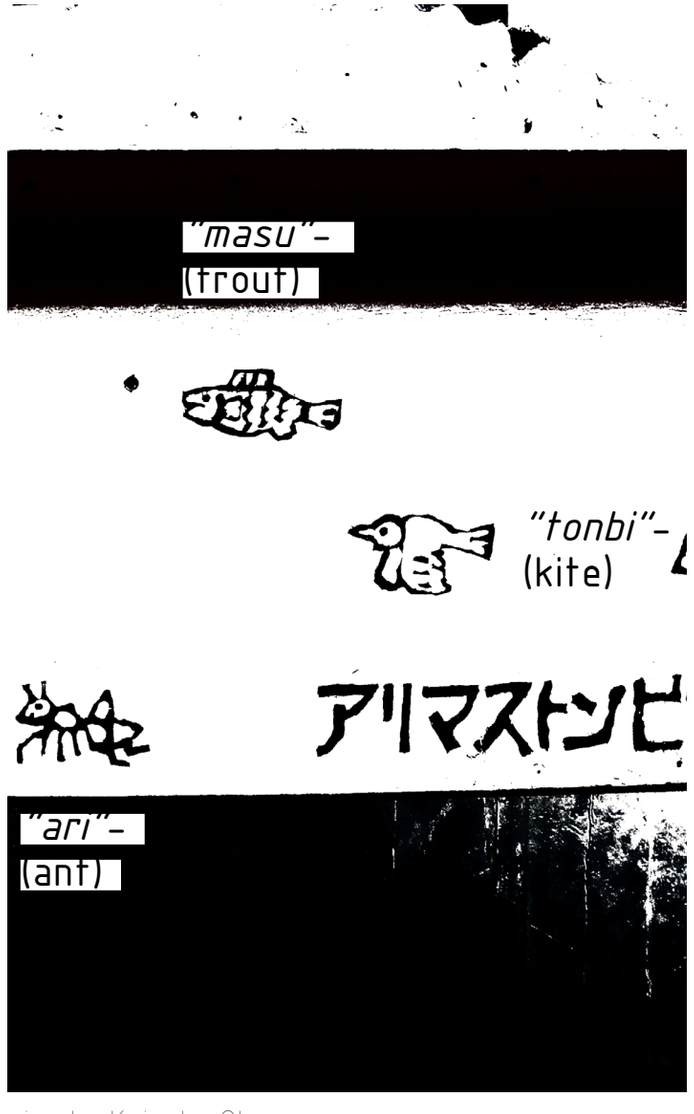
maya wireframe

introduction_

concept drawing for Arimasuton
Biru by Keisuke Oka

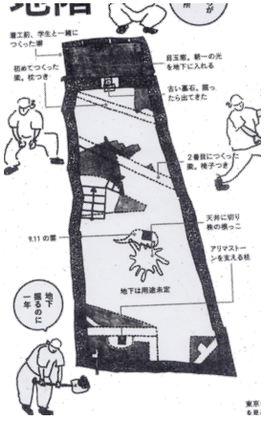
Arimasuton Biru

For this work, Arimasuton Biru was used as a case study. Arimasuton Biru is a concrete, 3-story plus basement house designed and built by Japanese architect, Keisuke Oka. construction of Arimasuton Biru began on february 23, 2005. the building is unique in that he is designing it without a plan and building it by hand and without the use of industrial machinery. For Mr. Oka, direct involvement in mixing, casting, and building of the concrete house has forced him to acknowledge both the possibilities and limitations of concrete while exploring his capacity to deal with them. as a result, the house is full of improvised and experimental casting. Unlike the concrete used in most buildings in Japan, Arimasuton Biru is built to last 200 years. This is achieved using a method of mixing cement with less than 40% water compared with the nearly 60% commonly used in commercial buildings. it is far from a conventional house and therefore cannot be represented fully by conventional methods of architectural representation. In the summer of 2018, I had the opportunity to visit Arimasuton Biru and meet Mr. Oka. I participated in analysis and documentation of the site and building. I chose to approach the representation of Arimasuton Biru by using new media tools to better express its unique character and essence.

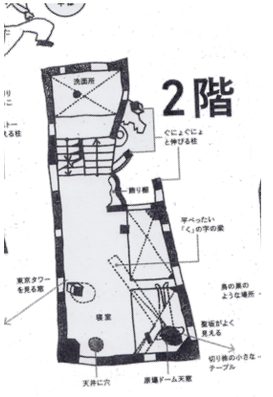


sign by Keisuke Oka

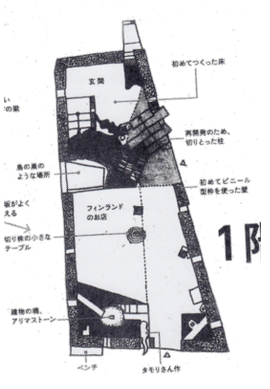
urban situation
(minato ward)



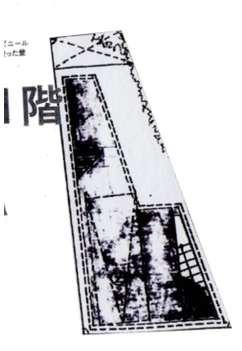
level1



level2



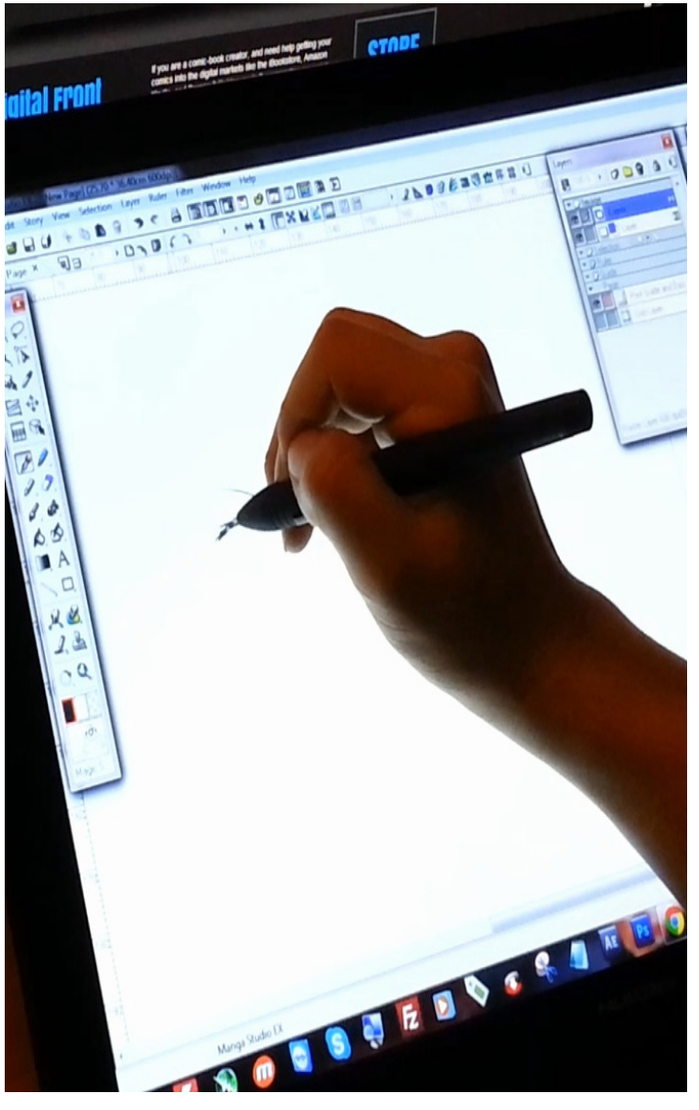
level3



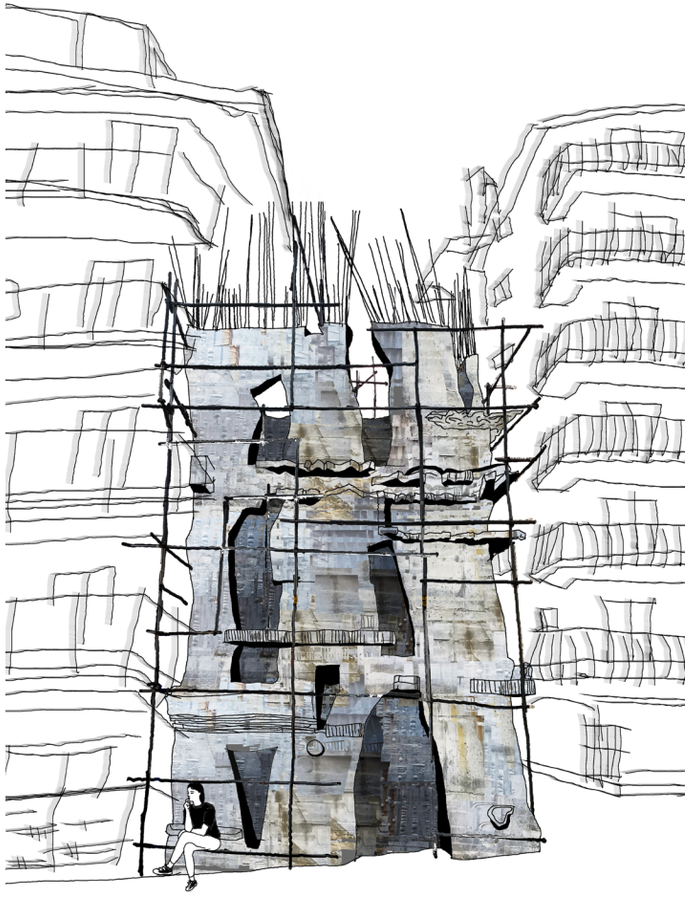
basement level

floor plans by Keisuke Oka

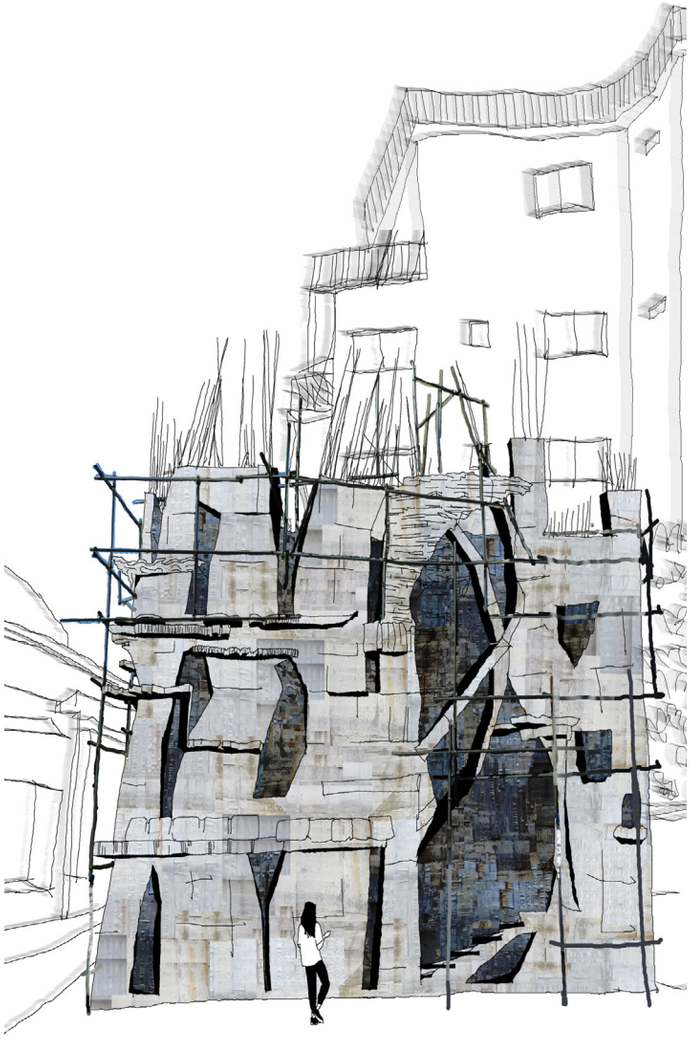
digital art



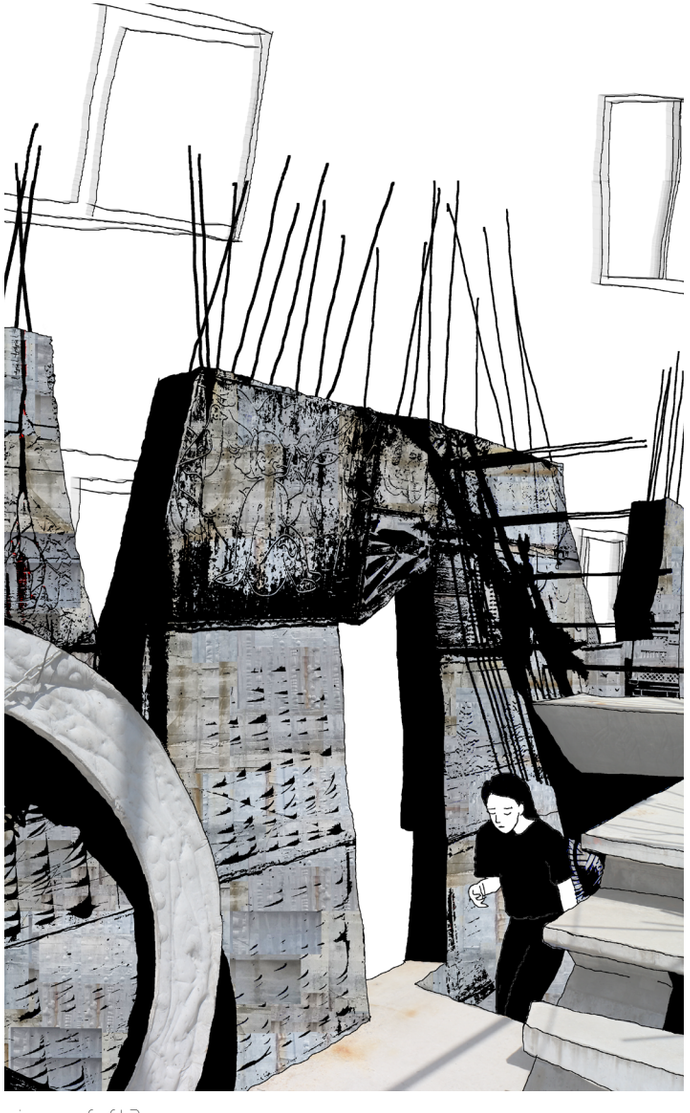
digital tools have birthed a new path not just for drawing but for imagining architecture. digital space can be created through forms of graphic quality.



elevation



elevation



view of fl3

view of fl3

3d scans

3D scanning can measure, document and record precise data pertaining to the physical world. using this technology, fragments of the house were digitized and archived for publication online.

25

12 fragment

26

12 fragment

27

12 stairwell

28

12 fragment

29

12 fragment

30

12 stairwell

31

11 facade

32

facade fragment

33

12 landing

34

11 fragment

35

13 landing

36

13 fragment

1

13 fragment

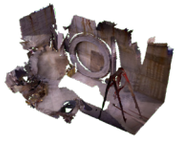
2

13 fragment

3

concrete ‘coin’

4



13 fragment

5

13 fragment

6

bottle

7

13 fragment

8

13 panel

9

13 panel

10

atrium

11

b1 fragment

12

b1 fragment

selected 3D scans

13

basement

14

b1 fragment

15

facade fragment

16

facade fragment

17

facade fragment

18

facade fragment

19

11 fragment

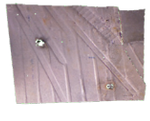
20

atrium fragment

21

wall panel

22



ceiling fragment

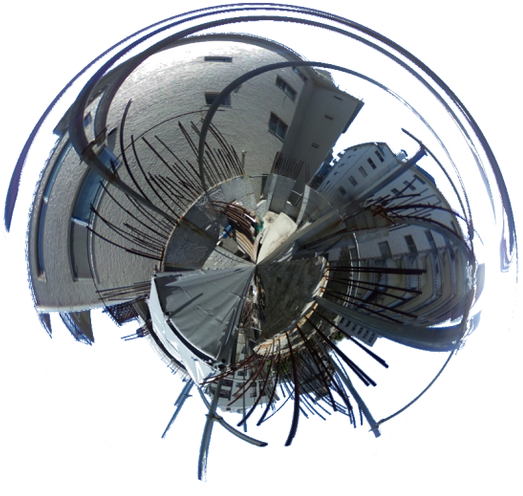
23

b1 fragment

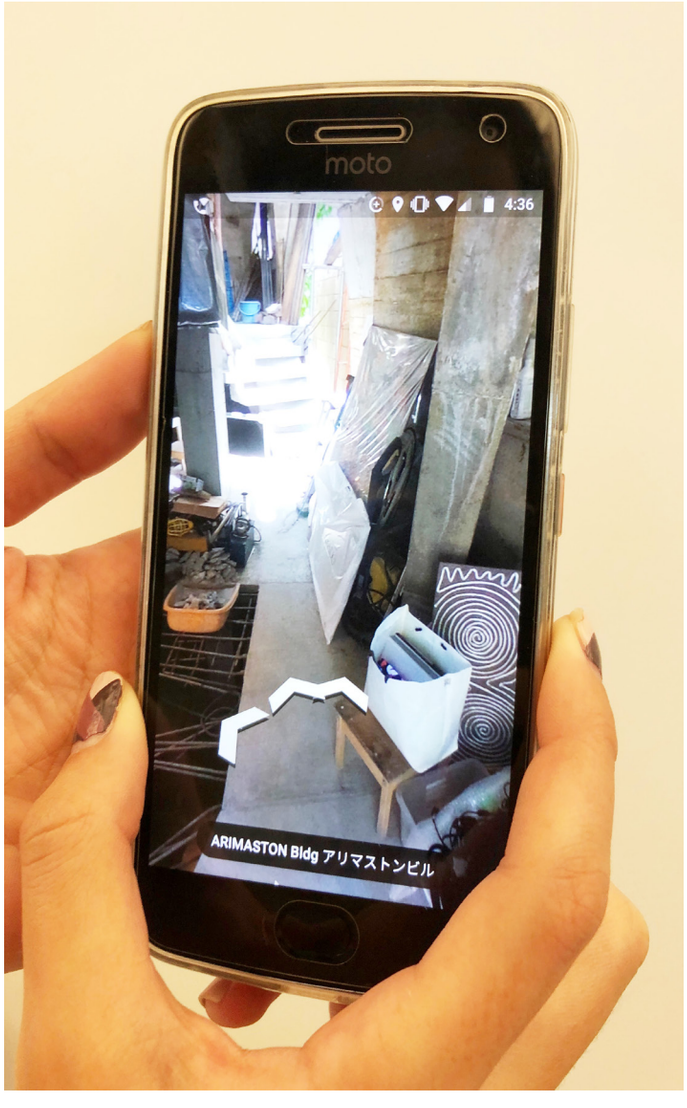
24

12 fragment

360 panorama online tour



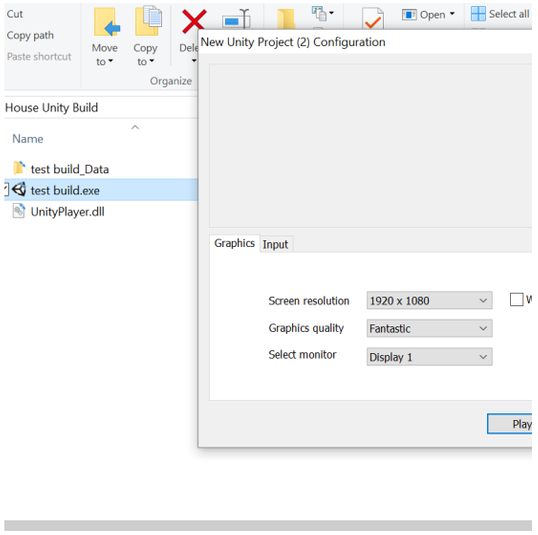
360 panorama images are an emerging trend in architectural design. the immersive quality facilitate spatial thinking by positioning the viewer directly in the space and context. they convey information such as orientation, distance size, etc. as the viewer rotates the screen



panorama tour

interactive house tour.
ground floor version
avail-able on google
street.

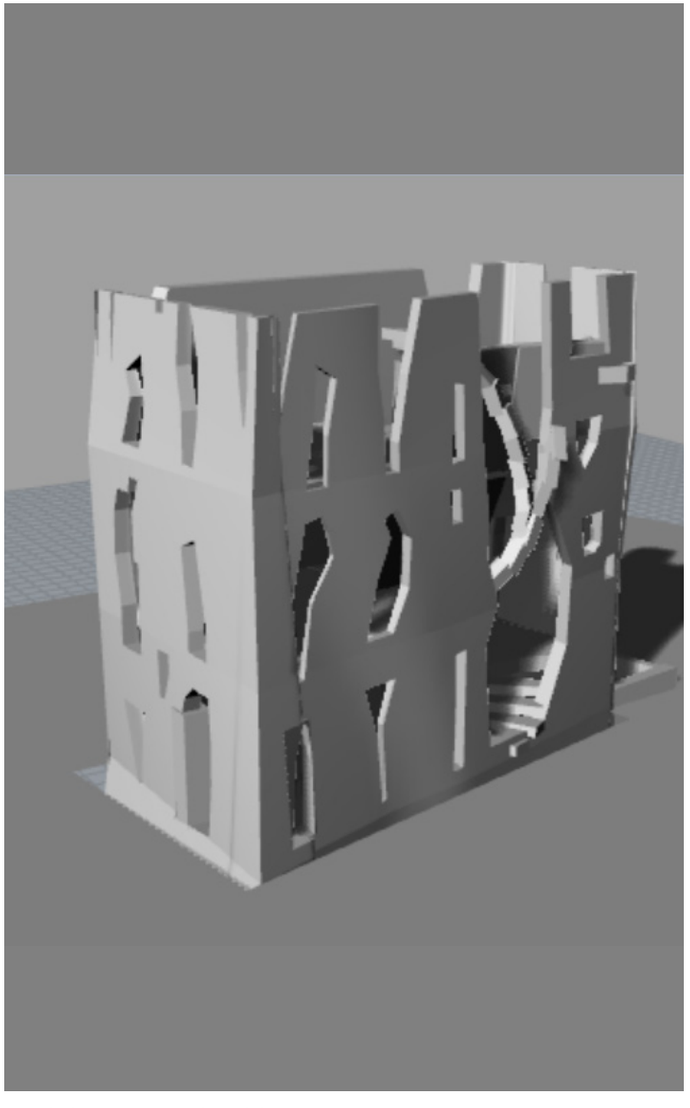
new media display



for the new media display, i recreated my experience of Arimasuton Biru by building a virtual reality scene. the scene contains site context, audio, the building modeled from my memory and documentation, and key assets unique to the space

production

several software were utilized to create the new media display. starting with topography, data was obtained through SketchUp's geo-location function. site context data was collected through Open Street Map and was converted into vector format using a grasshopper plug-in in Rhino. this provided building foot prints and roadways to work with. the plug-in was also used to super impose this information onto the topography to create the final site context model.
creation of the building model started with a rough building shape in rhino, which referenced 360 photos and 3d scans. the 3d model was then moved into Maya for fine tuning. smaller assets were modeled in rhino. textures were created by editing photos from the site in Photoshop. bump maps were created from the textures. tex-tures, bump maps, and other materiality such as glass and metal made using Maya's Arnold plug-in were applied to the 3d model assets in Maya. Models were exported as obj files and brought into Unity where the new media scene was set up. VR camera components were added to scene as well as sound and a 360 panorama skybox.



model process in rhino

result

the final outcome is an executable build.

view of level3

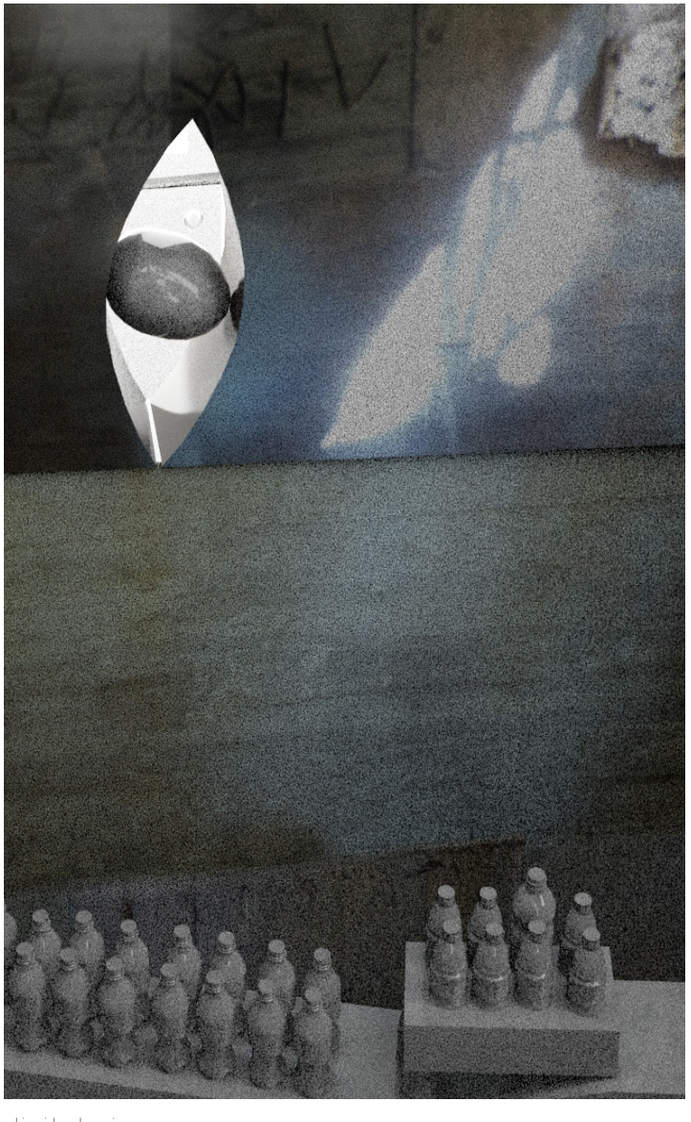
basement entrance

digital view

concrete bottles

digital view

eye-shaped window



digital view

stairwell

digital view

references

DA LUZ PINTO, PEDRO, and MIGUEL BAPTISTA TAV-
e ev ti a d e e e-
tati c itect e mi cad a e c m-
incad.org/data/works/att/ecaade2013r_001.
content.pdf.

Valkó, László. The Evolution of Online Art through
Social Media. 2015, www.art.pte.hu/sites/www.
art.pte.hu/files/files/menuk/dokument/dla/
disszertacio/bakos_andras/bakos_andras_
thesis.pdf.

c e ma ame t d cti e ve ti
a d et ic c itect a a i a e ie
Mellon.

imated ace e ie ce a d te t i te -
acti a d c itect a e i i iti
Words In Space, Words In Space, 8 Sept. 2017,
wordsinspace.net/shannon/2012/12/02/animat-
ed-spaces-experience-and-context-in-interac-
tion-and-architectural-design-exhibitions/.

a a it c itect a a i
- and What That Implies for the Role of Repre-
e tati i c itect e a a d a ci
Online, 21 Oct. 2008, www.tandfonline.com/doi/
full/10.1080/13602360802453327#_i11.

ac am c itect e te t e e
t i ita a i et i 8
www.metropolismag.com/architecture/archi-
tecture-enters-age-post-digital-drawing/
pic/22613/.

a ti e eative ce i a c ete -
e c itect ect a ve
a d m vi ati e a a ime ct
2018, www.japantimes.co.jp/news/2018/10/01/
national/creative-force-concrete-jungle-ar-
chitects-tokyo-project-draws-love-improvisa-
tion/#.XFdZG1xKjcs.

e a e i ace c itect e e-
ima i ed evie e a dia a dia e
and Media, 26 Jan. 2014, www.theguardian.com/
artanddesign/2014/jan/26/sensing-spac-
es-royal-academy-review.

Why Architects Should Use 360º Panorama Images
i e i evie de 6
modelo.io/blog/index.php/2017/08/16/archi-
tects-use-360-panorama-images-design-re-
views/.

Academic Vita

—

EDUCATION

PENNSYLVANIA STATE UNIVERSITY

SCHREYER HONORS COLLEGE | class of 2020

Bachelor of Architecture , Bachelor of Fine Arts
Minor in Architecture History, Minor in Art History

PANTHEON INSTITUTE

Rome, Italy | Fall of 2018

PROFESSIONAL EXPERIENCE + RESEARCH

PENN STATE LABORATORY OF DEVELOPMENTAL NEUROSCIENCE

GAME DESIGN INTERN | Fall of 2016- Present

Working with a team to build a computer game for Scherf Laboratory Researchers. Assisting research on serious gaming and its effectiveness in teaching non-verbal social cues to teenagers with autism. Tasks include level design, character design and animation, asset modeling and debugging

ERICKSON DISCOVERY GRANT

UNDERGRADUATE RESEARCHER | Summer of 2018

Conducted and applied research on the representation and dissemination of unconventional architecture using unconventional mediums, New Media. Used Arimasuton Biru (Tokyo, Japan) as a case study. Created and shared various content in the forms of a 360 panorma tour, a VR build , a 3D scan archive, and a computer game.

BELLISARIO COLLEGE OF COMMUNITCATIONS

UNDERGRADUATE RESEARCHER | Spring of 2018

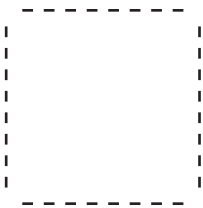
Assisted PHD student with research on the effects of virtual reality on human perceptions and behavior.

LEADERSHIP

STUDENT SOCIETY FOR DESIGN INNOVATION

PRESIDENT | Spring 2019 - Present

Organizing and leading meetings for design related majors to collaborate on a range of interdisciplinary projects ranging from exhibition design to design competitions

GRANTS

Kuhlin Family International Research Grant- Summer 2019
Schreyer Study Abroad Grant- Spring 2019
Erickson Discovery Grant- Summer 2018