

# Graduation Structure & Spatial Design Updates

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WEEK 4

# GRADUATION STRUCTURE

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Admission and assessments

<b>A1</b>	<b>Kick-off</b>	Formal assessment of the graduation setup
<b>A2</b>	<b>Midterm</b>	Progress review of the preliminary research/design
<b>A3</b>	<b>Green Light</b>	Formal final assessment of the final research/design
<b>A4</b>	<b>Final</b>	Assessment of the public presentation for a lay audience of the final research/ design of the A3 (only the presentation may have been amended)

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# A1

# Graduation Report Deliverables

Front Matter	PART 1: Introduction	PART 2: Approach	Back Matter
<ul style="list-style-type: none"><li>❑ Title</li><li>❑ Name &amp; Student Number</li><li>❑ Studio &amp; Supervisors</li><li>❑ Table of Contents</li><li>❑ Foreword, Reading Guide and/or Abstract</li></ul>	<ul style="list-style-type: none"><li>❑ Problem Statement</li><li>❑ Relevance</li><li>❑ Objective &amp; Motivation</li><li>❑ Research and/or design questions</li><li>❑ Scope</li></ul>	<ul style="list-style-type: none"><li>❑ Methods</li><li>❑ Theoretical Framework</li></ul>	<ul style="list-style-type: none"><li>❑ Appendices</li><li>❑ References</li><li>❑ Acknowledgements</li></ul>

# Research / Design Question

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“How can **biophilic design** principles be adapted to a lunar lava tube habitat using **ISRU 3D-printed** architecture to support astronaut **mental health** and **well-being**?”

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# Spatial Qualities

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Examples from nature



Pictures were taken by me while walking through nature

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# Spatial Qualities

Examples from nature

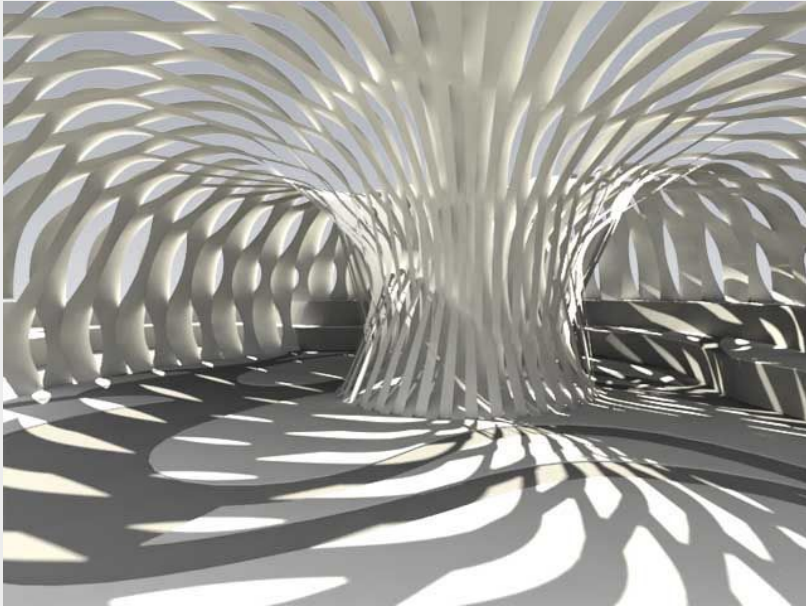


- Organic form
- Central column
- Lightweight structure

Pictures were taken by me while walking through nature

# Spatial Qualities

Examples



<https://nl.pinterest.com/pin/492649951246462/>

- Rounded dome shape with central column
- Structure can play a biophilic role
- Central column could hold life support elements like ventilation for each pod/room



# Spatial Qualities

Examples



- Organic rounded walls
- Bends in walls can hide recessed private spaces
- Soft curves give it a more cozy feel

<https://www.archdaily.com/973281/3d-printing-prefabrication-and-interior-design-construction-trends-for-2022/61b13a74f91c8117d1000028-3d-printing-prefabrication-and-interior-design-construction-trends-for-2022-image>



# Spatial Qualities

Examples from nature



- Family of individual structures
- Clustered structure → interconnected
- Overlapping
- Growth / expansion over time

Pictures were taken by me while walking through nature

# Spatial Qualities

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Example



<https://www.edenproject.com/mission/architecture>

- EDEN PROJECT
- Inspired by nature
- Interconnected domes
- Indoor environment differs from the outside

# PROGRAMME

UPDATE IN SPREADSHEET

TYPOLOGY		SIZE						ACTIVITY			PRIVACY			EXTERIOR	
PROGRAMME	ROOM	MAX. CAPACITY	MIN. AREA PER PERSON (m2)	FACTOR	AREA FOR 6 (m2)	% OF HABITAT	MIN. HEIGHT (m)	CATEGORY	CROSS-FUNCTION	Details	CAPACITY	VISIBILITY	ACOUSTICS	ACCESS	VIEW
Dirty Zone	Airlock (EVA Prep)	x	x	x	x	x	x	Support	/		Small groups (2-3)	Enclos...	Neutral	Yes	No
	Lunar Soil Lab	x	x	x	x	x	x	Work	/		Large groups (4-6)	Enclos...	Neutral	No	No
	Geology Lab	x	x	x	x	x	x	Work	/		Large groups (4-6)	Enclos...	Neutral	No	No
	System Maintenance	x	x	x	x	x	x	Support	/		Small groups (2-3)	Enclos...	Neutral	No	No
	Storage (outdoor equipment)	x	x	x	x	x	x	Support	/		Storage	Enclos...	Neutral	Yes	No
Core Utility Zone	Life Support Systems	x	x	x	x	x	x	Support	/		Small groups (2-3)	Enclos...	Sound ...	No	No
	Systems Maintenance	x	x	x	x	x	x	Support	/		Small groups (2-3)	Enclos...	Sound ...	No	No
	Storage (food, water, oxygen)	x	x	x	x	x	x	Support	/		Storage	Enclos...	Neutral	No	No
	Bathrooms	x	x	x	x	x	x	Support	/		Individual	Enclos...	Sound ...	No	No
Personal/Quite Zone	Private quarters	x	x	x	x	x	x	Person...	/		Individual	Enclos...	Sound ...	No	No
	Meditation Room	x	x	x	x	x	x	Person...	/		Individual	Enclos...	Sound ...	No	Yes
	Medical Bay	x	x	x	x	x	x	Person...	Support		Small groups (2-3)	Enclos...	Sound ...	No	No
Social Zone	Kitchen	x	x	x	x	x	x	Social	/		Small groups (2-3)	Open	Neutral	No	No
	Dining Room	x	x	x	x	x	x	Social	/		Large groups (4-6)	Open	Neutral	No	Yes
	Living Room	x	x	x	x	x	x	Social	/		Large groups (4-6)	Open	Neutral	No	Yes
	Social Space	x	x	x	x	x	x	Social	/		Large groups (4-6)	Open	Neutral	No	Yes
	Gym	x	x	x	x	x	x	Social	/		Large groups (4-6)	Open	Neutral	No	No
Work Zone	Research Labs	x	x	x	x	x	x	Work	/		Large groups (4-6)	Hybrid	Neutral	No	No
	Agricultural Lab	x	x	x	x	x	x	Work	/		Large groups (4-6)	Hybrid	Neutral	No	No
	Command & Control	x	x	x	x	x	x	Work	Support		Small groups (2-3)	Hybrid	Sound ...	No	Yes
	Radio Room	x	x	x	x	x	x	Work	Support		Small groups (2-3)	Hybrid	Sound ...	No	No

Bubble diagrams can be formed based on computational logic

# Summary

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- How do I bring biophilic elements into the architecture?
- Look at examples in nature, e.g. mushroom systems
- Interconnected network, yet individual elements

