FABRICADEMY
textile and technology academy

مساحة الصنّاع
The Makerspace

A Program by | أحد برامج

مؤسسة ولي العهد
Crown Prince Foundation

MURJAN
مرجان

CORAL REEF AQABA GULF JORDAN

3D-Printed Solutions for Jordan's Marine Ecosystems

PRESENTED BY : HANEEN KHALEEL


31°N
30°N
29°N
28°N
27°N
Gulf of Aqaba
Red Sea

ONLY 49 WORLD HERITAGE SITES HAVE BEEN FORMALLY DESCRIBED FOR MARINE VALUES. AND DIVERSITY “UNESCO” AQABA - BIO DIVERSITY

MY APPROACH

Clay 3D print

Bio composite material in Jordan

Test Material in water + Fragment

CASE STUDIES

TerrAqua

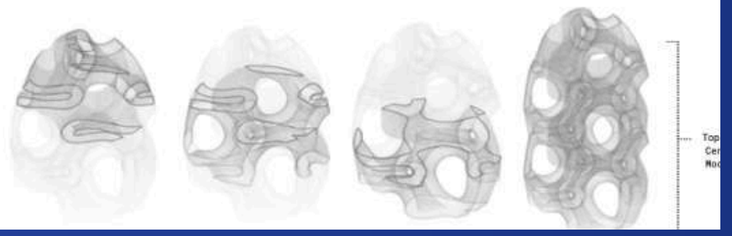
3D PRINTED CLAY CORAL REEF TO ENHANCE MARINE BIODIVERSITY

Holly Adams - Fabricademy, Barcelona 2025

Key Words: Bioremediation | 3D BioPrinting | Conservation | Parametric Architecture | Organic Design

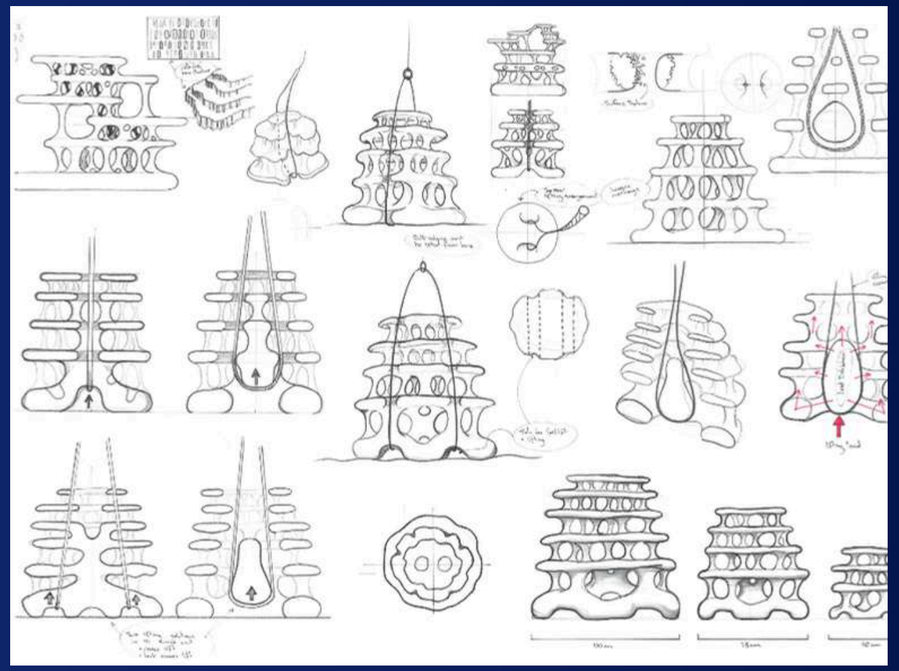
Using **advanced manufacturing** technology and **digital fabrication** techniques to design a **modular** structure which aims to promote **marine biodiversity** in Pujada Bay, Philippines.

Due to climate change, coral reefs have declined by 50% since the 1950s and 90% are projected to have severely degraded by 2050. Novel methods of restoration are optimising 3D printing to create artificial reefs that repopulate devastated marine environments, yet designing a habitat which caters for a variety of marine species is largely unexplored.



Fabricademy -Case study

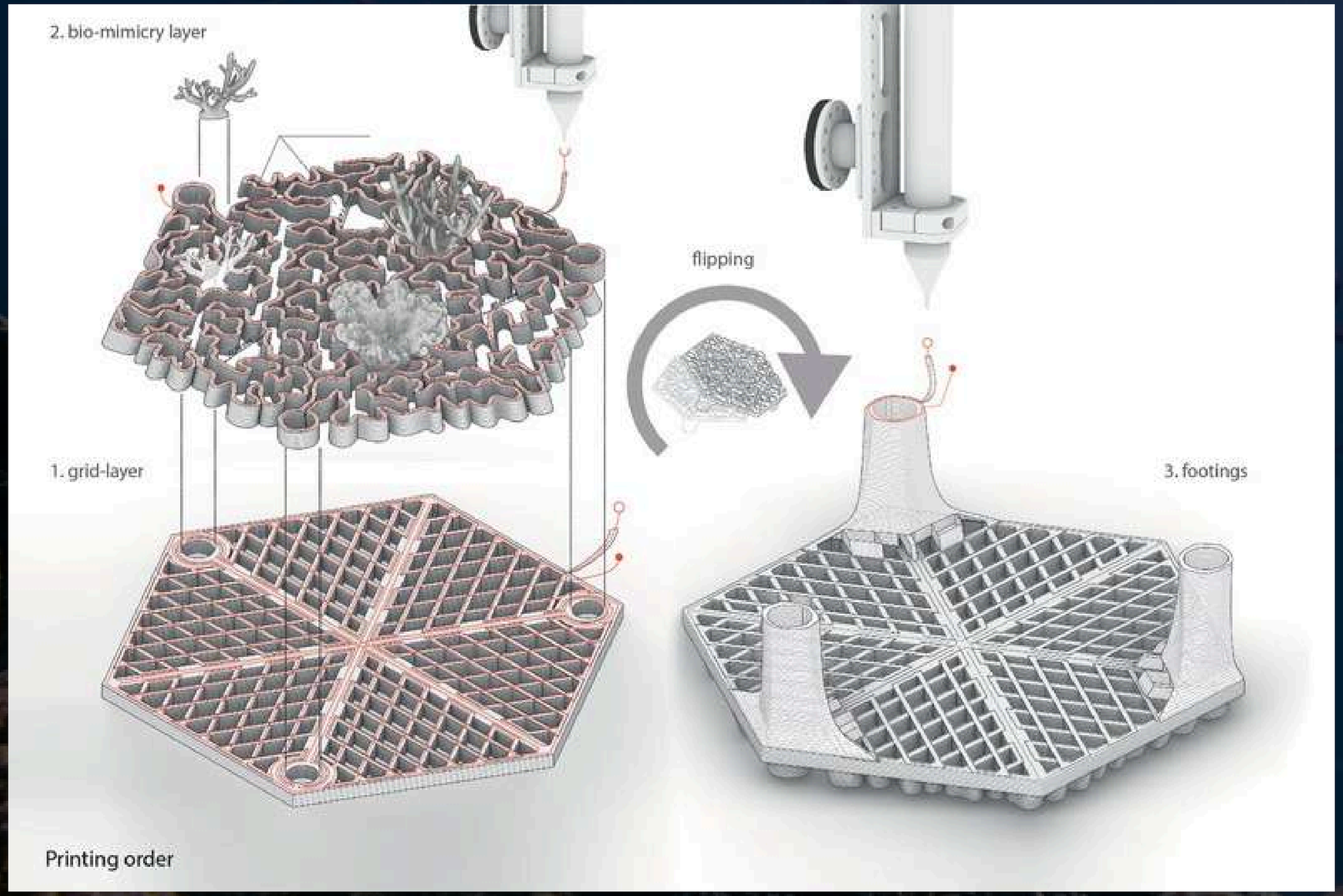
Architecture Uni



REEF LAB

Eduardo Souza- Case Study

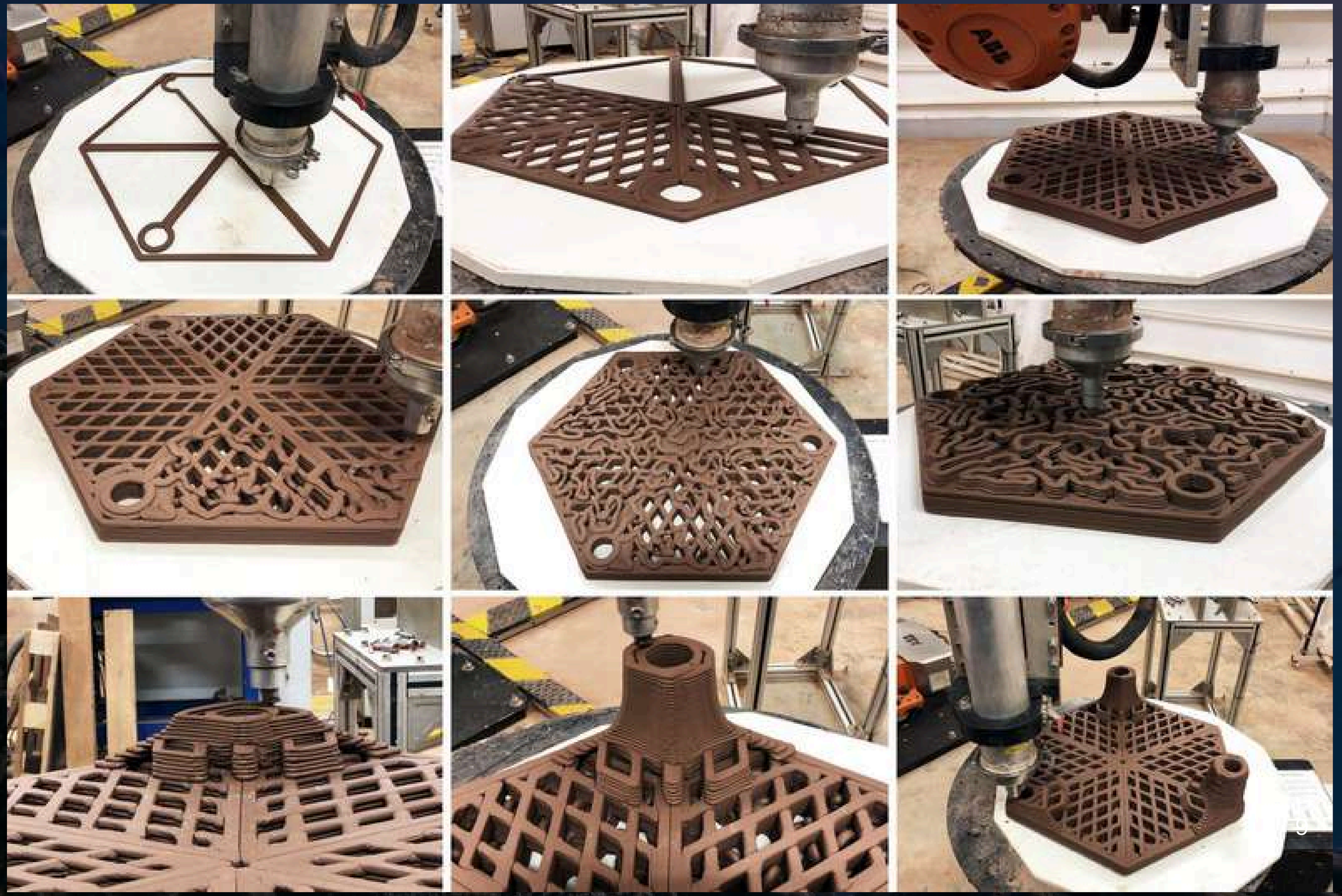
https://www.archdaily.com.br/br/947440/repensando-recifes-artificiais-atraves-de-impressao-3d-de-argila



CLAY - 3D PRINT

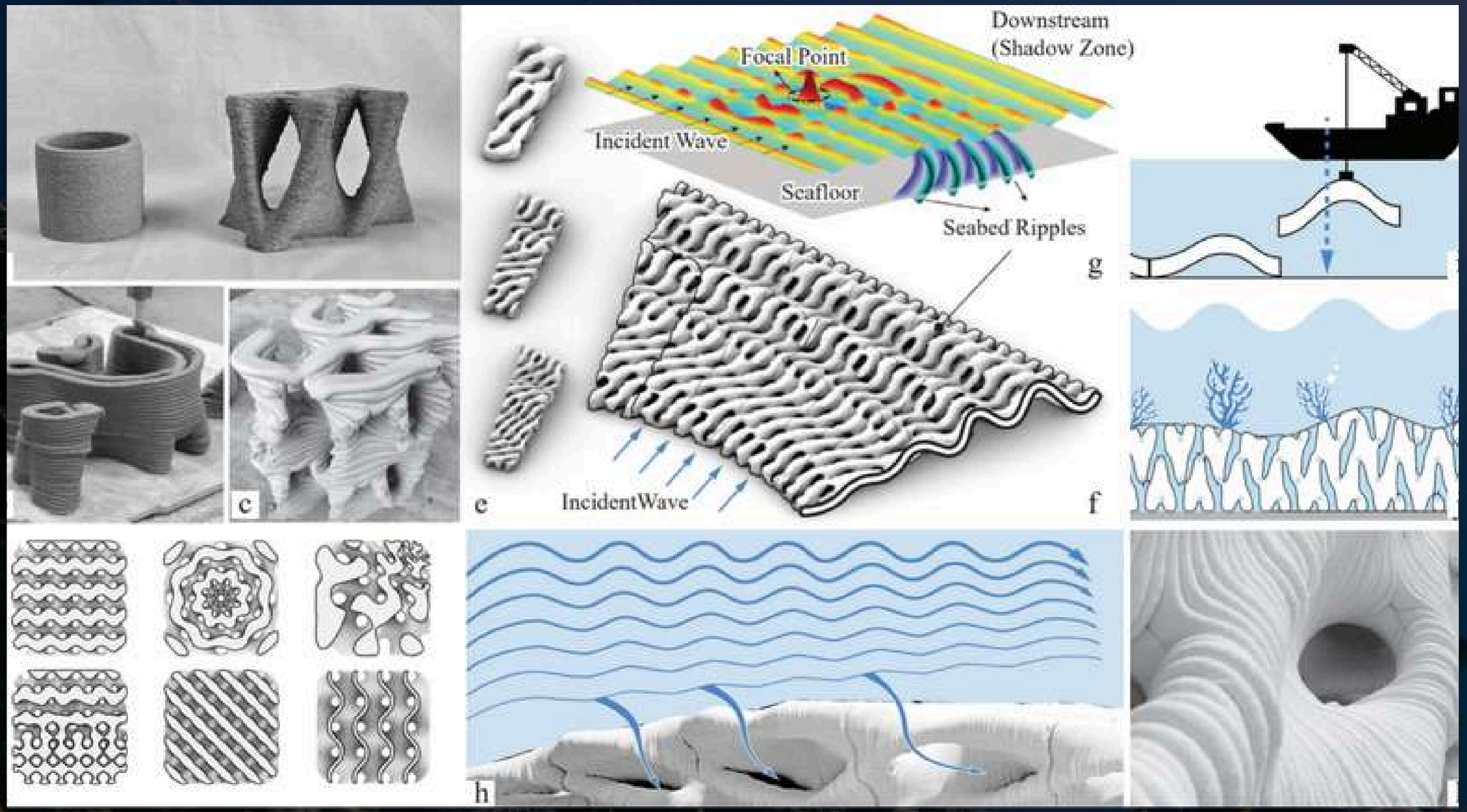
Bio- mimicry layer - different shapes based on Aqaba corals

Clay 3d print stages



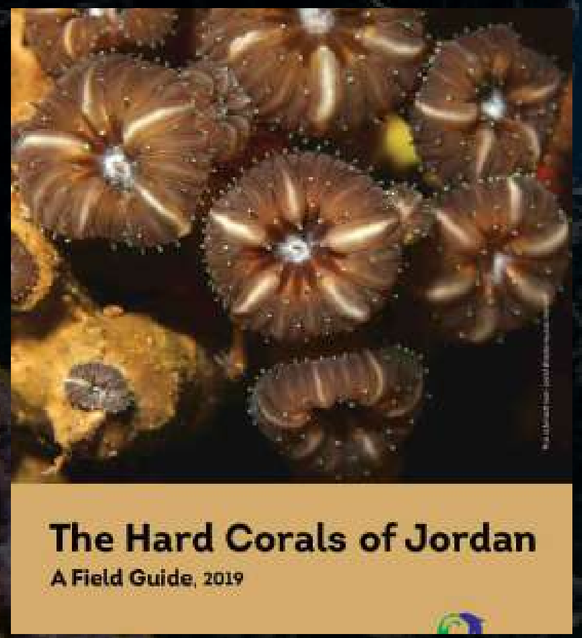
Waves and the shafts

Designing Artificial Reef Structures that Help Harness Wave Energy



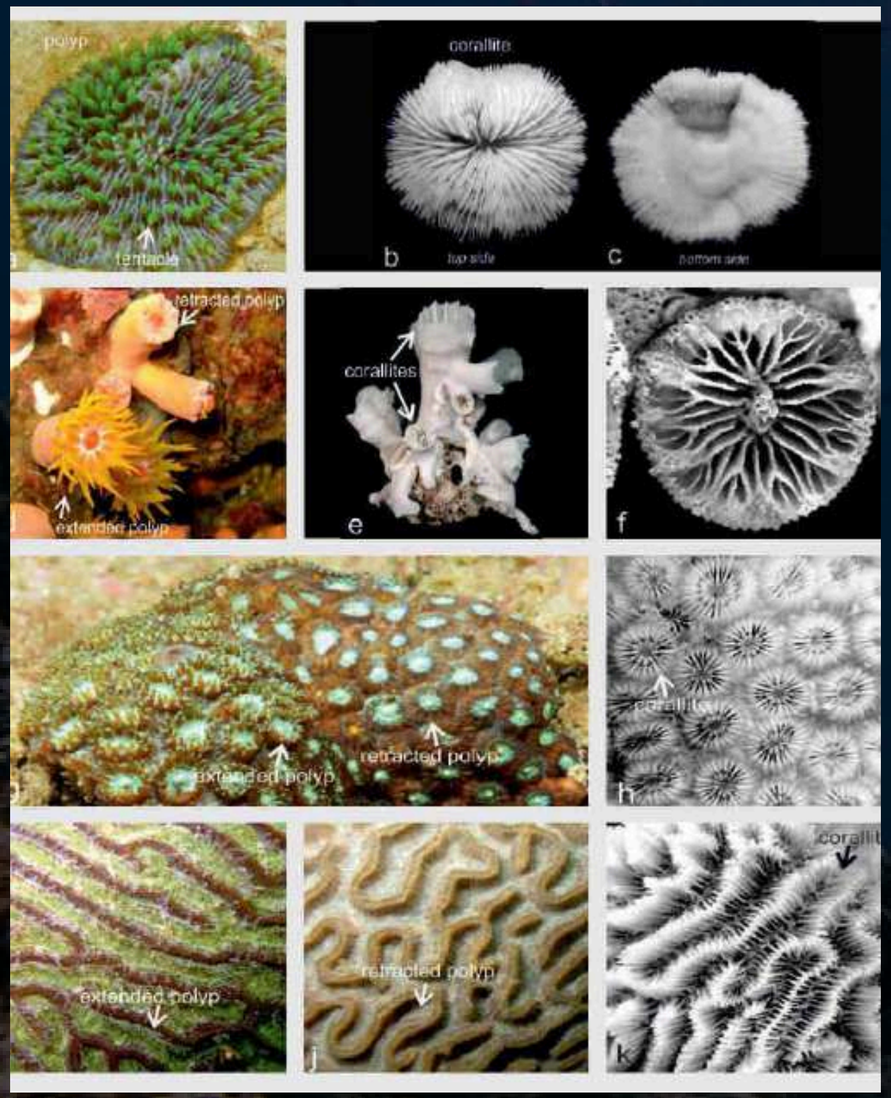
Main Reference for coral shapes

RESOURCES AND REFERENCES



Stakeholders

I contacted and looking for collaborate with Marina center of Aqaba,
DLocal and international marina biologist in jordan
,Aqaba govenment
Jordan university Aqaba .
Engineers



AQABA - CORALS SHAPES

Photos are during clay workshop at CPF
Jordan lab with Cristiano Pesca, former Wasp and clay expert

CHALLENGES:

Test Local Clays + outside

3d Print Bio Materia;

test the material in artificial sea water

WHO CAN BENIFIT FROM THIS PROJECT ?

RESEARCHERS
R&D

SUSTAINABLE PROJECTS

NGOs

MATERIAL specialist
Fabrication Labs

Architects
Designers

References

Architecture	https://papers.cumincad.org/data/works/att/caadria2022_271.
Material: Alginite	Study of the degradation in an ultisol of alginate-chitosan complex and its stability and applicability as a soil conditioner - ScienceDirect
Material (Alginite) + 3D print	Rheology and 3D printing of alginate bio-stabilized earth concrete - ScienceDirect
Material 3d	Design and Manufacturing — Living Seawalls
Scaffold Alginite :	Three-dimensional printing of alginate: From seaweeds to heart valve scaffolds | QScience.com
bIO-TECHNOLOGY : MATERIAL: ALGINITE	Schematic of 3D RGO/Alg scaffold fabrication. | Download Scientific Diagram
Material: alginate-chitosan complex and its stability and applicability as a soil conditioner	Study of the degradation in an ultisol of alginate-chitosan complex and its stability and applicability as a soil conditioner - ScienceDirect
3D printing of alginate bio-stabilized earth concrete	Rheology and 3D printing of alginate bio-stabilized earth concrete - ScienceDirect
Microbe -Nitrogen Bacteria	Scientists discover slimy microbes that may help keep coral reefs healthy | MIT News | Massachusetts Institute of Technology
Artificial Reef Structures that Help Harness Wave Energy	Designing Artificial Reef Structures that Help Harness Wave Energy | Weitzman

Case studies

MARS — ALEX GOAD	REEF LAb
Three-dimensional printing of alginate: From seaweeds to heart valve scaffolds | QScience.com	Article
Jordan begins latest 3D printed coral reef restoration effort in Aqaba - 3D Printing	Aqaba lab
Overview - Holly Adams	
Rethinking artificial reefs through clay 3D printing | ArchDaily Brasil	Architecture- Archdaily
3D-printed artificial reefs to restore coral ecosystems	PA

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THANK YOU

Haneen Khaleel