PORTFOLIO

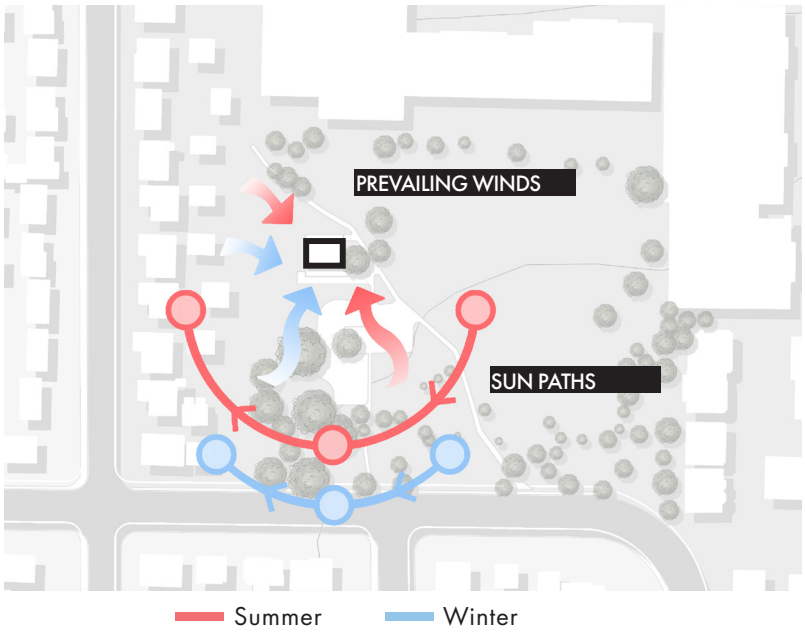
Mapendo Ngilinga de Carvalho

MMXXI

Eos Public Library

Project: Energy Efficient Library Concept
Instructors: Joyce Kim, Elizabeth English
Semester: Fall 2020
Media: Rhino, AutoCAD, Lumion, Illustrator

In collaboration with Nicolas Gomes, Joyceline Nathaniel, and Lacey Oliver

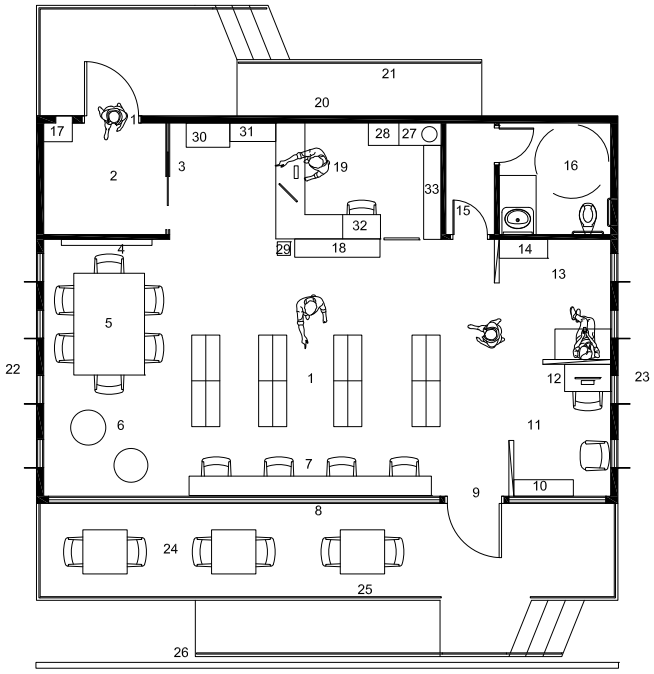


The Eos Public Library applies climate-responsive strategies from the early stages of design in order to create a highly energy efficent and comfortable library space for its users. Located in Edmonton Alberta, the library leverages a number of passive heating and cooling strategies, devised from a series of data-driven site and climate analyses., in order to enhance the building's performance. High-tech materials such as aerogel insulation and mass timber allow the building to take on unique properties such as translucency and openeness, while simultaneously contributing to a pleasant indoor microclimate.

Experiential Goals

Experiential goals
- Cozy central fireplace for source of warmth during cold winter months (18)
- Cool breeze blowing in from operable windows in the summer (22, 23)
- Vestibule for a smooth transition between exterior and interior temperatures (2)
- Covered veranda to enjoy rainy afternoons (24)
- Reading spaces flooded with diffused natural light all year round (5, 6, 7, 11, 13)

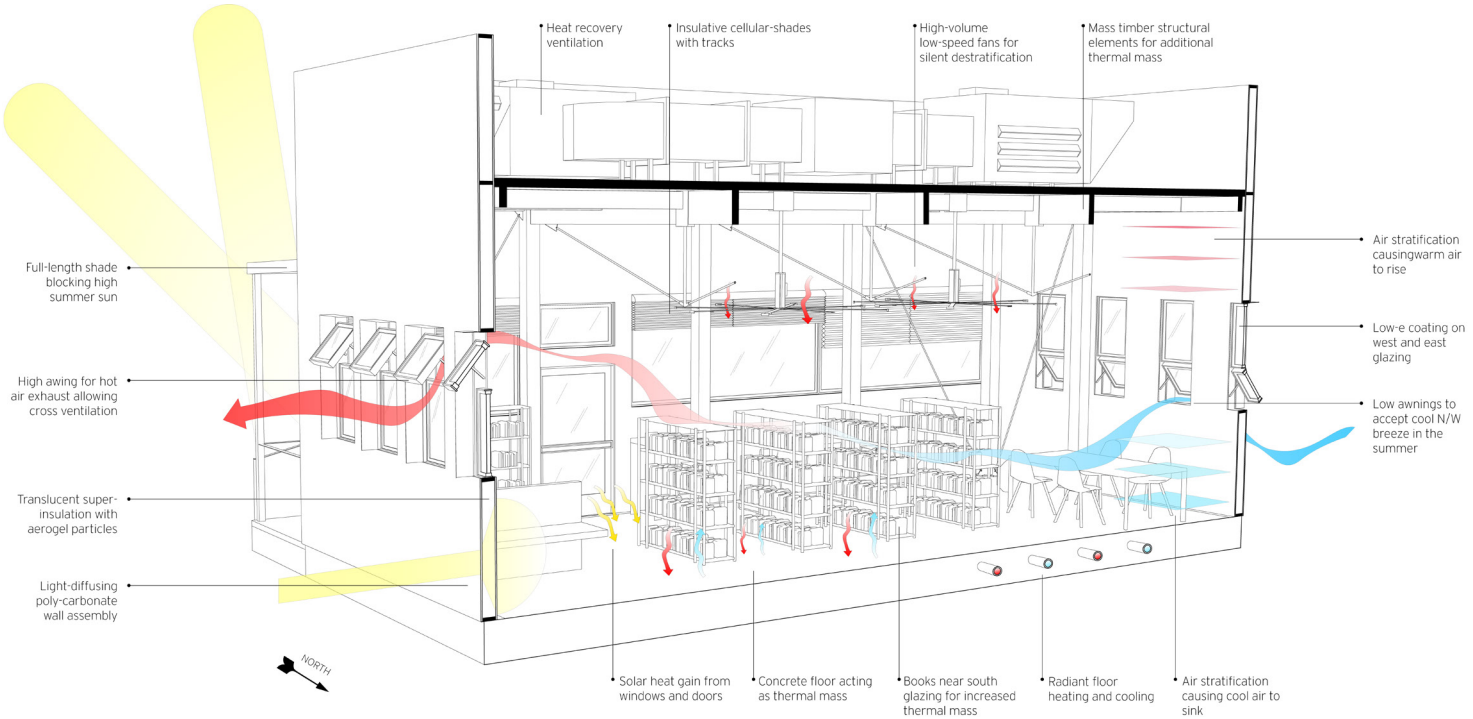
half wall symbol



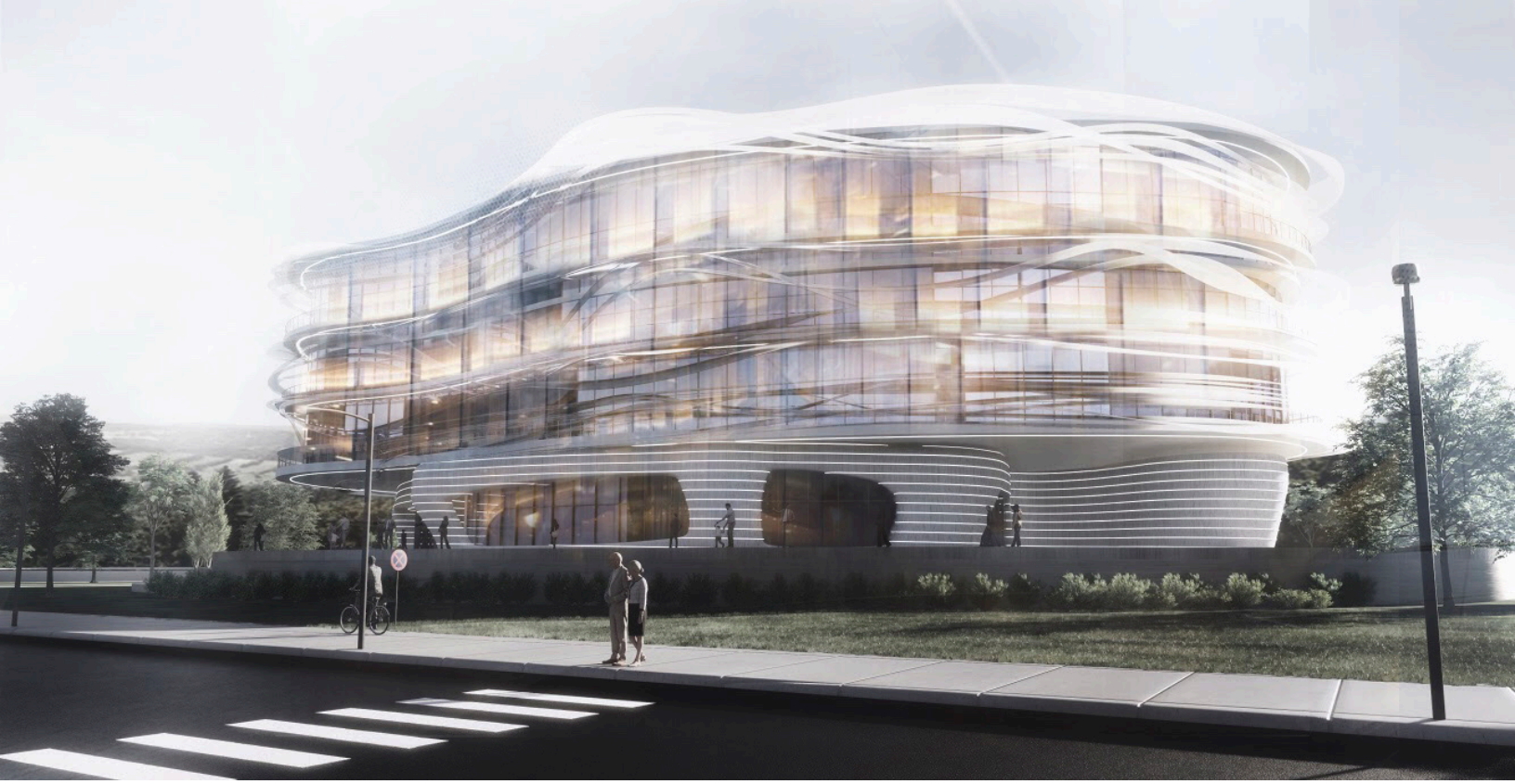
1 Adult Collection
2 Vestibule
3 automatic sliding glass door
4 wall mounted display
5 table study
6 bean bags
7 high table study
8 south glazing
9 exit
10 teens collection
11 teens area
12 computer desk
13 children area
14 children section
15 privacy hallway for bathroom
16 ADA compliant bathroom
17 book slot and book collector well
18 electric fireplace
19 reception
20 no glazing on north wall
21 accessibility ramp
22 low awnings on west facade
23 high awning for warm air exhaust
24 outdoor seating with seasonal roof removed in winter
25 fence for privacy
26 gap for storage of roof during winter
27 Boiler
28 Electrical Breaker
29 E-Catalog
30 Self-Checkout
31 Featured Books
32 Desk for secondary worker
33 Shallow storage

Floor Plan

Passive Heating and Cooling Strategies



Perspective Section



Vistula Library

Competition: Libgen - Genesis of Libraries
Awards: Shortlisted amongst 80+ international design groups
Semester: Winter 2019
Media: 3Ds Max, Rhino, Grasshopper, Vray, Photoshop

In collaboration with Nicolas Gomes and Rose Tabassi

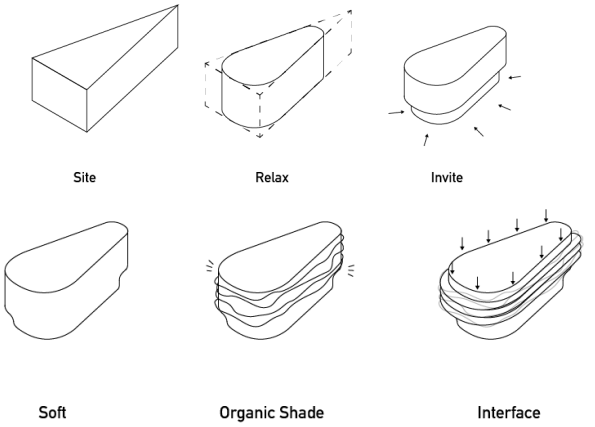
The very first learners were explorers. The ones who dared to venture out in unfamiliar land, fueled by their innate desire to expand their consciousness. Vistula library seeks to chanel in us this explorative energy, pushing each individual to challenge their preconceived notions of the world, while providing a nurturing environment for those new thoughts to flourish.

In a world where information is digitized, filtered, and curated, we are able to find what we are looking for faster than ever before. However, the effectiveness of these search algorithms comes with a bitter after effect. Because we are fed more and more of what we like and what we seek, we are pushed deeper and deeper into our own, personalized reality, and drawn away from any contradictory content. Though technology has brought us closer to those we love, it has also brought us away from the unfamiliar. More than ever before, we need a space that allows for serendipitous encounters, free exploration, and human connection. This is the new definition of the library.

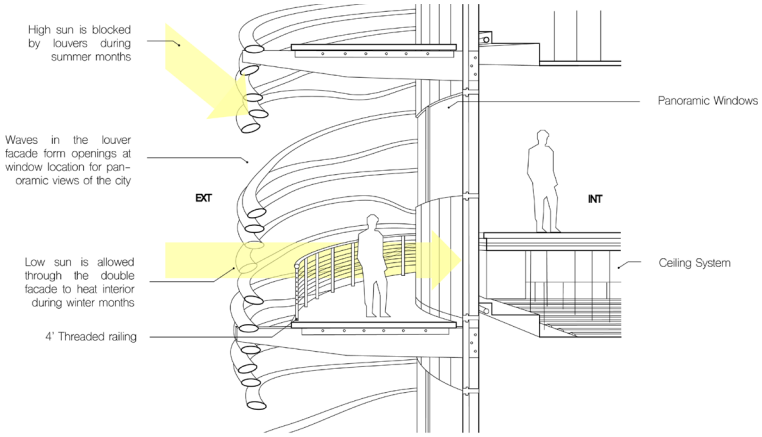
Interior view of the lobby

Library space and children area

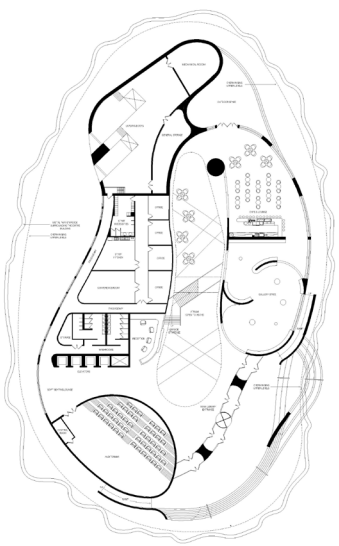
Morphology



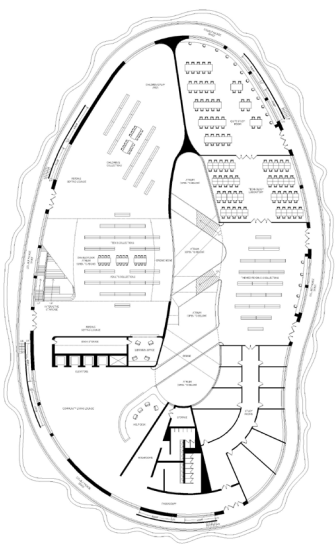
Shade System



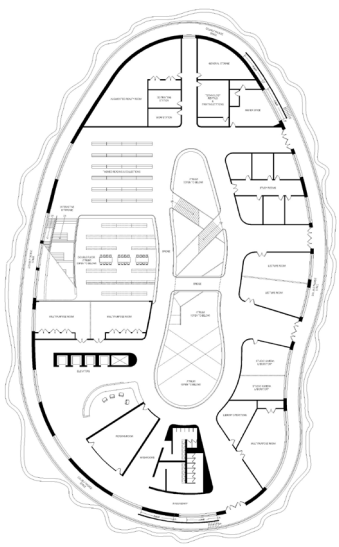
Floor Plans



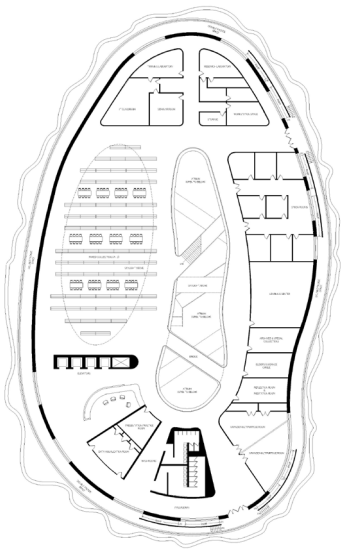
1st Floor



2nd Floor



3rd Floor

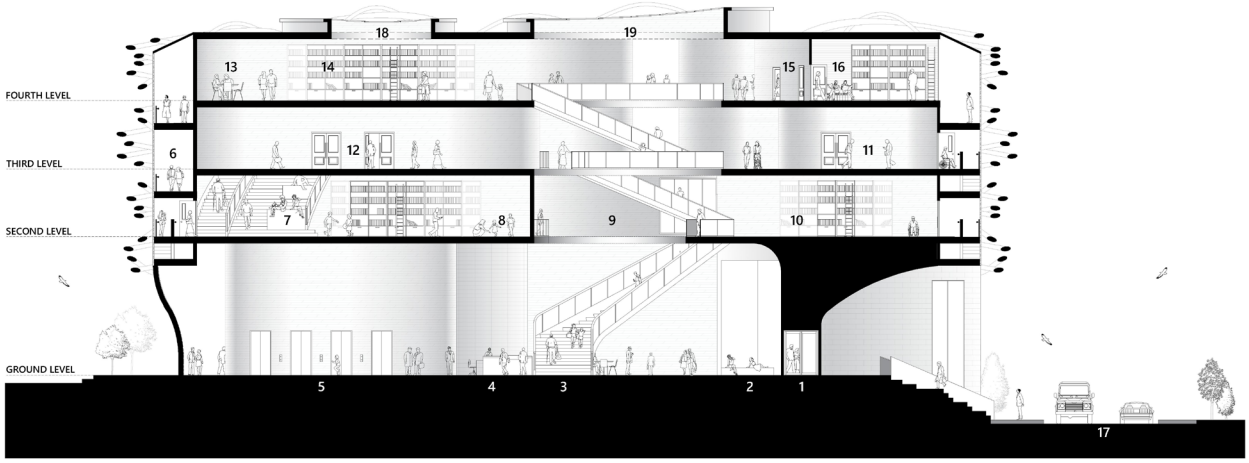


4th Floor

Elevation Section

BUILDING SECTION - LOOKING WEST

1. Vestibule
2. Gallery
3. Grand Staircase
4. Reception
5. Elevators
6. Double Facade System
7. Interactive Staircase
8. Adult Collection
9. Multi-level Atrium
10. Themed Reading and Collection
11. Lecture Room
12. Multi-purpose Room
13. Soft Seating Lounge
14. Mixed Collections (A - Z)
15. Study Rooms
16. Archived and Special Collections
17. Drop-off/Pick-up (Street Level)
18. Collections Skylight
19. Atrium Skylight



Algae BioFacade

Project: Façade System Concept
Instructors: Andrea Atkins, Jonathan Enns
Semester: Spring 2020
Media: Rhino, AutoCAD, Photoshop, Illustrator

In collaboration with Drew Bigelow

Typically, building enclosures fulfill 3 main functions: structural support, thermal control, and water/vapour/air management. In this project, we explore a potential 4th function: energy generation.

Located on the facade the chemical engineering building of University ofWaterloo, the BioFacade cultivates algae inside glass compartements to capture the energy of the sun. On-site processing plants can extract the bloomed algae to transform it into biofuel, which is then burned and used as a source of heat or electricity. The CO2 produced can be captured and redistributed in the algae facade to help with photosynthesis. The result is a visually captivating facade, whose industrial aesthetic reflect the nature of the activities within its walls.

Technology

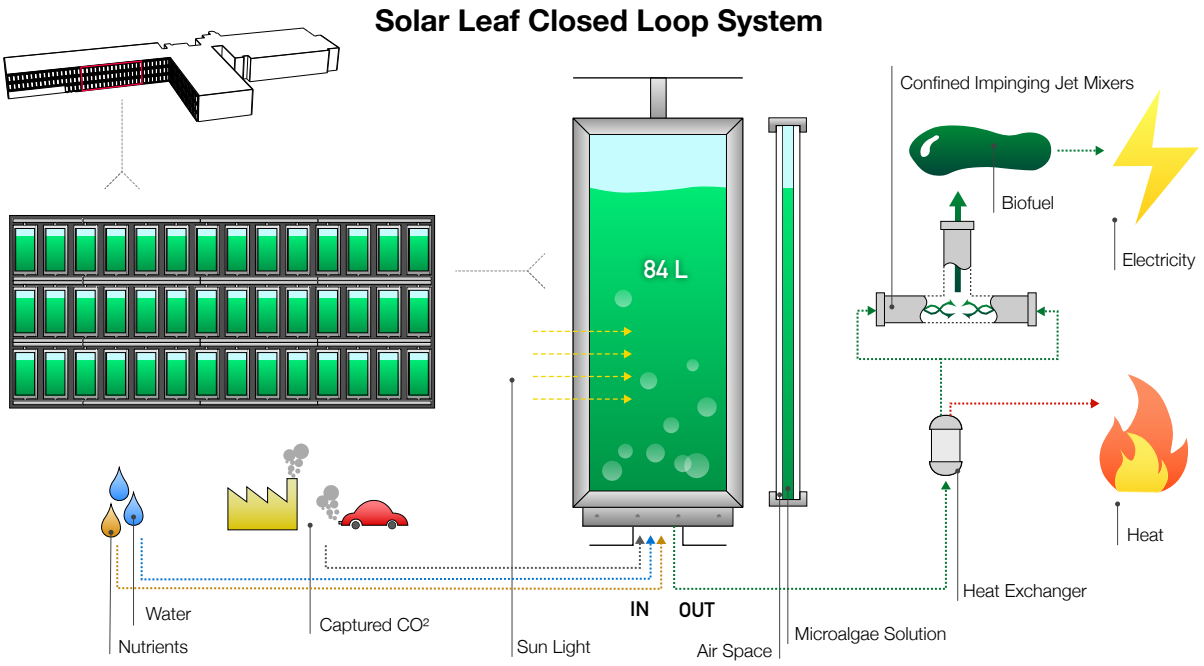
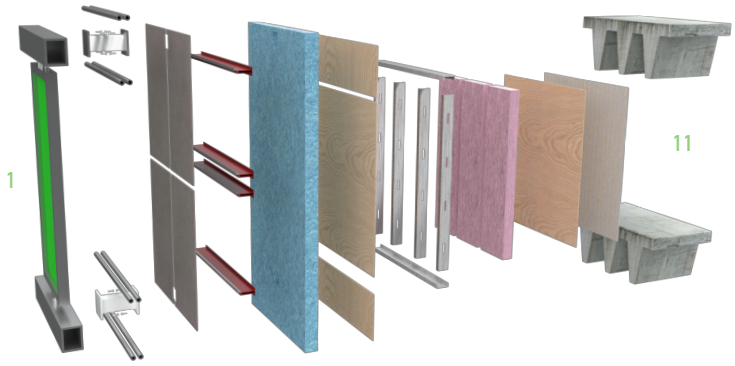


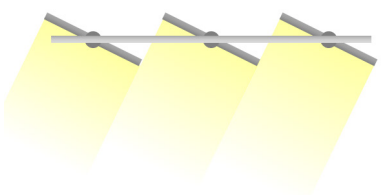
Illustration of the solar leaf technology that powers the Algae BioFacade

Facade Assembly



1 Solar Leaf
2 Transport Ducts
3 Fiber Cement Panes
4 Cascadia Clips
5 Rigid + Membrane
6 Plywood Sheathing
7 Steel Studs
8 Batt Insulation
9 Plywood Sheathing
10 Drywall
11 Concrete Slabs

System Features



Intelligent Sun Tracking

Algae Density Variance

Summary of Functions

Heat Generation

Electricity Generation

Adaptive Shading

Acoustic Control

Carbon Sequestration

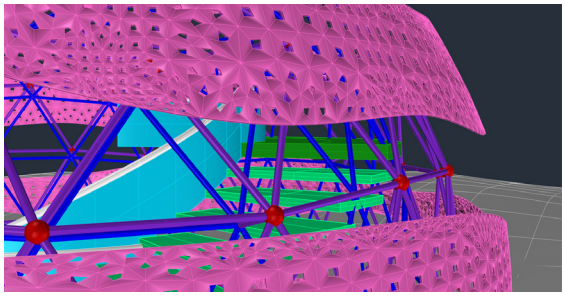
Air purification

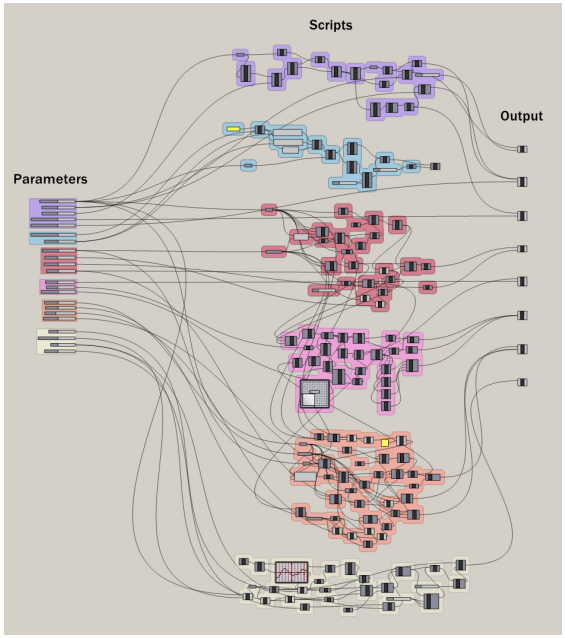
Aura

Project: Park Pavillion Concept
Instructors: Cory Zurell, Fiona Lim Tung
Semester: Summer 2019
Media: Rhino, Grasshopper, Vray, 3D Printing

In collaboration with Patrick Angkiriwang, Molly Sang, Sarah Furtado

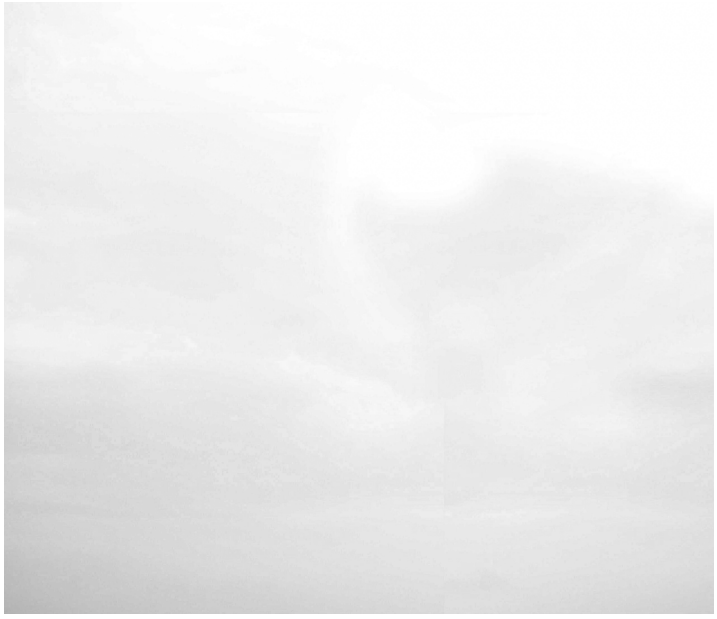
Aura is a pavillion that draws from the organic slopes of Waterloo park to create an eye-catching landmark in the City of Waterloo. The pavillion was generated using computational design tools and is fully described parametrically. The goal with this approach is to create a structure that visually portrays the technical prowess of the University of Waterloo.





Photography

This is where it all started. Ever since I began looking at the world through the lens of a camera, I became passionate with our natural and built environment. Photography is a medium through which one's reality can be visually expressed for others to see and empathize with. I find this notion intrinsically linked with the process of architectural design. Throughout my projects, I make a concerted effort to reflect the building's environment and the culture of its people in the structure itself.



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