MEET
THE SPEAKERS


TOMI **BAMGBELU**


TUOYO **JEMERIGBE**


ADE **SHOKUNBI**


VICTORIA **IKEDE**


MAURICIO **AMADO**


BABATUNDE **OLADOGBA**


ONYINYE **IGBOKWE**


ONYEMA **UDEZE**


HASSAN **ANIFOWOSE**

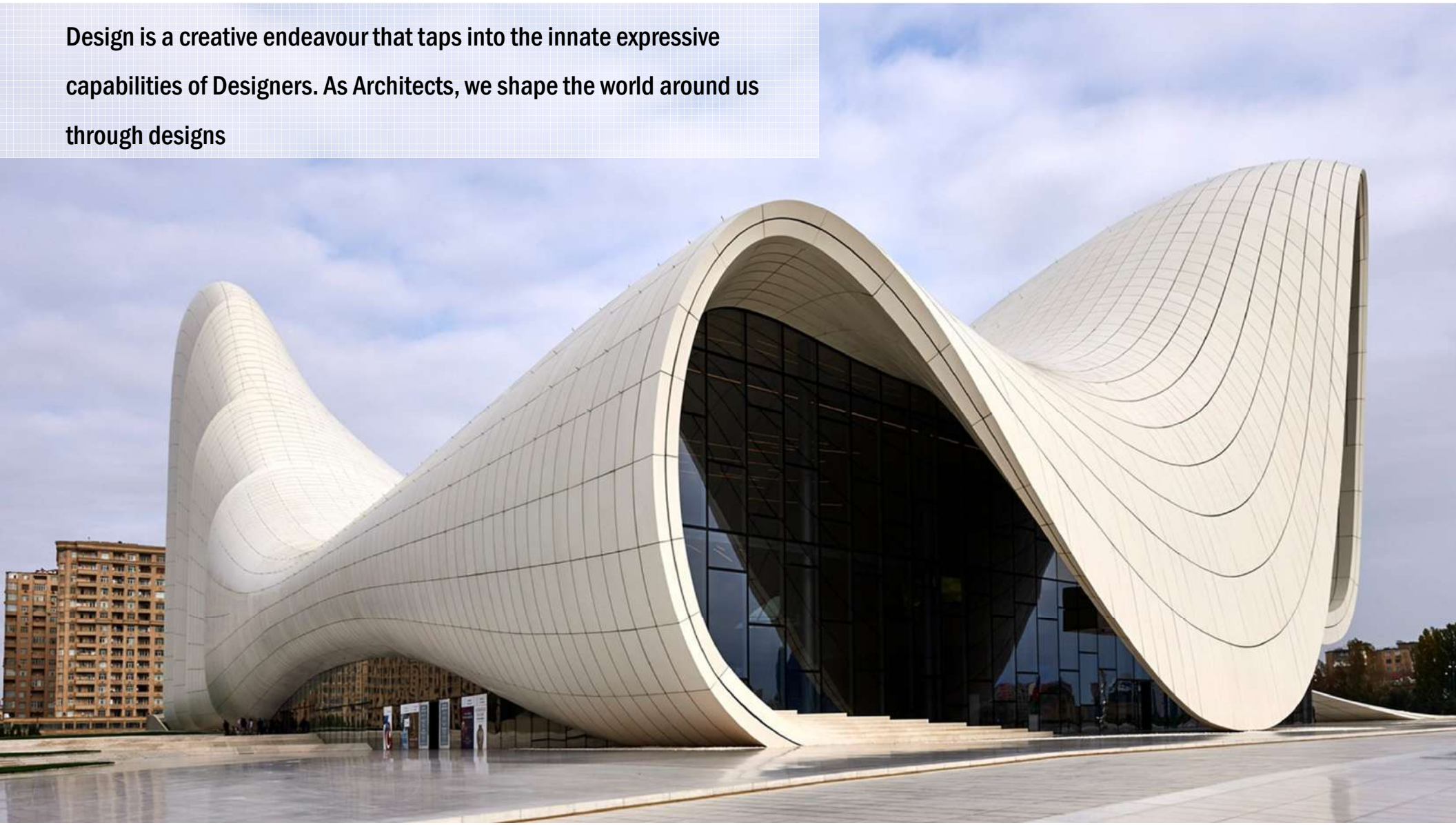
Creative Architects 2021

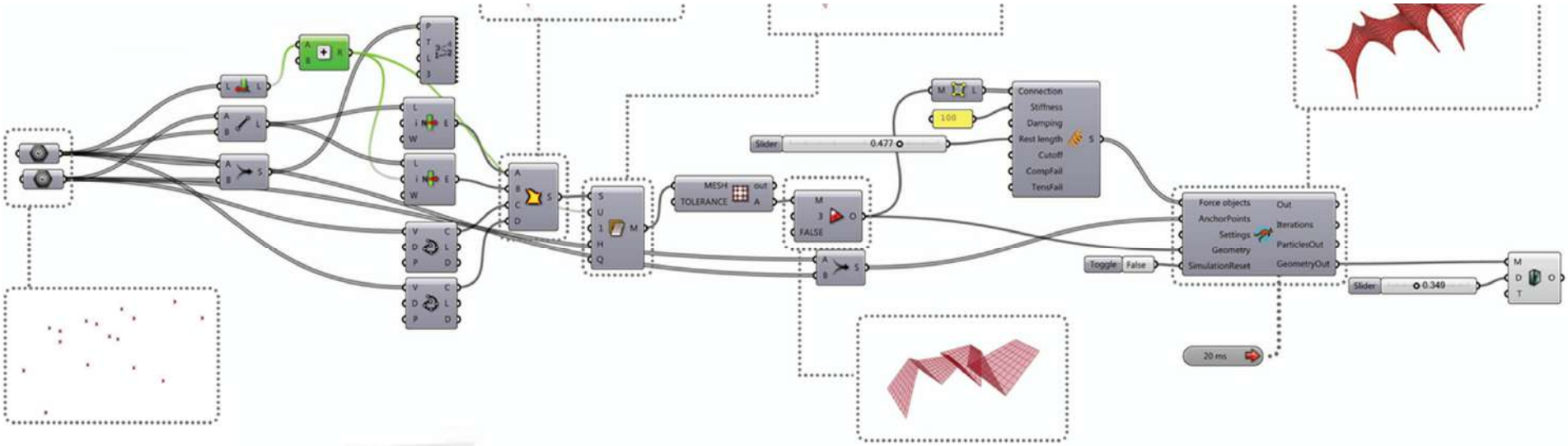
ADAPTATION:
A RESPONSE TO CHANGE

STAY CURIOUS, STAY INSPIRED.

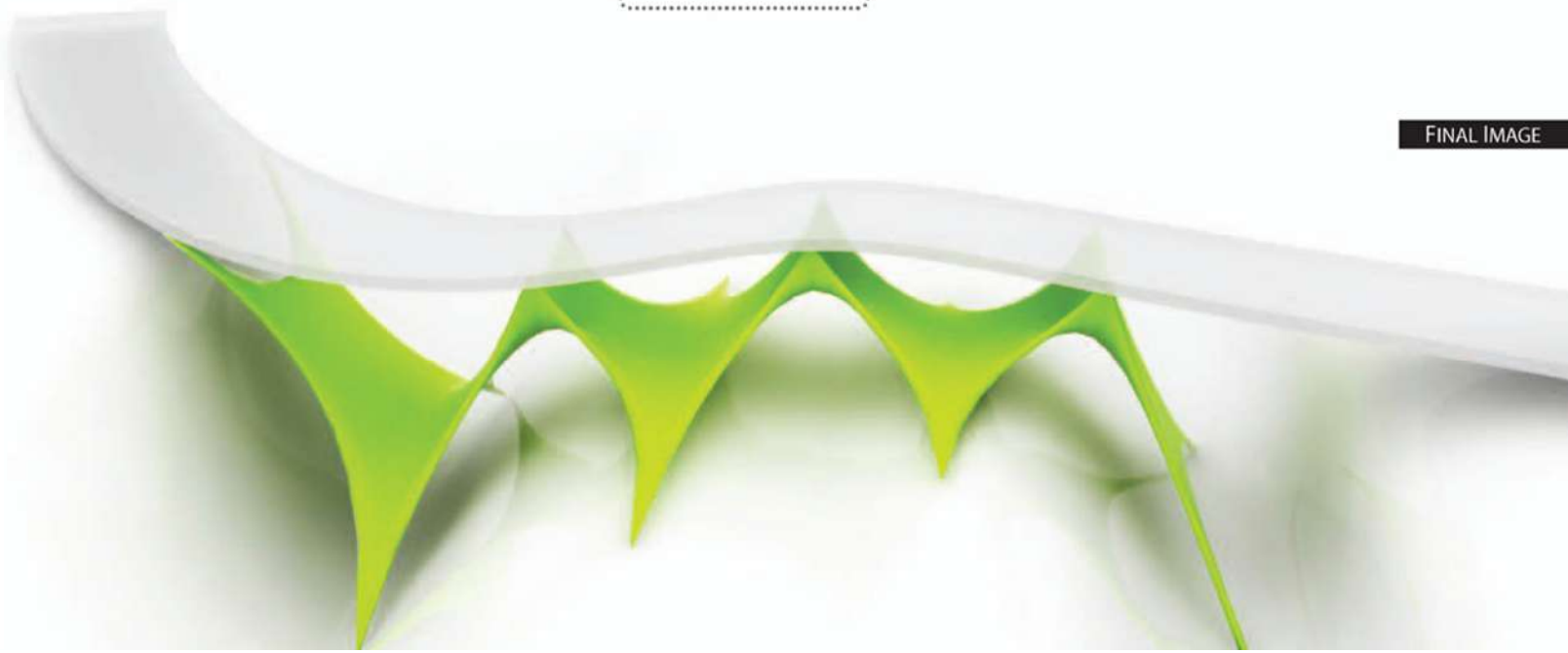

1
BACKGROUND
I'm an Architect by Profession, a BIM Modeler, and a Systems Designer
2
CONSULTANT
I'm the co-founder of Blaze Inc. - a Digital Integrations and BIM Consultancy outfit based in Nigeria
3
CONTENT CREATOR
I've authored a book, written several long and short-form articles, and I create contents in a wide array of formats
4
CERTIFICATIONS
I'm an Autodesk Certified Professional (ACP) for Reivit Architecture, Mechanical, and Elecrtical Disciplines
5
LIL INSTRUCTOR
I'm an Instructor at Linkedin Learning

Design is a creative endeavour that taps into the innate expressive capabilities of Designers. As Architects, we shape the world around us through designs





In recent years, the emergence of Artificial Intelligence (AI) has brought up new ways to iterate the design process, leveraging technology.



FINAL IMAGE

What is Design Automation

Design Automation entails using software programs to complement Architects/Designers by taking care of repetitive/redundant tasks, unleashing creative designs beyond the latent creative potentials of the human mind in the process

In the world of 3D Modeling, there are two broad classifications of tools: **Generic** Modeling Tools and **Parametric** Modeling Tools

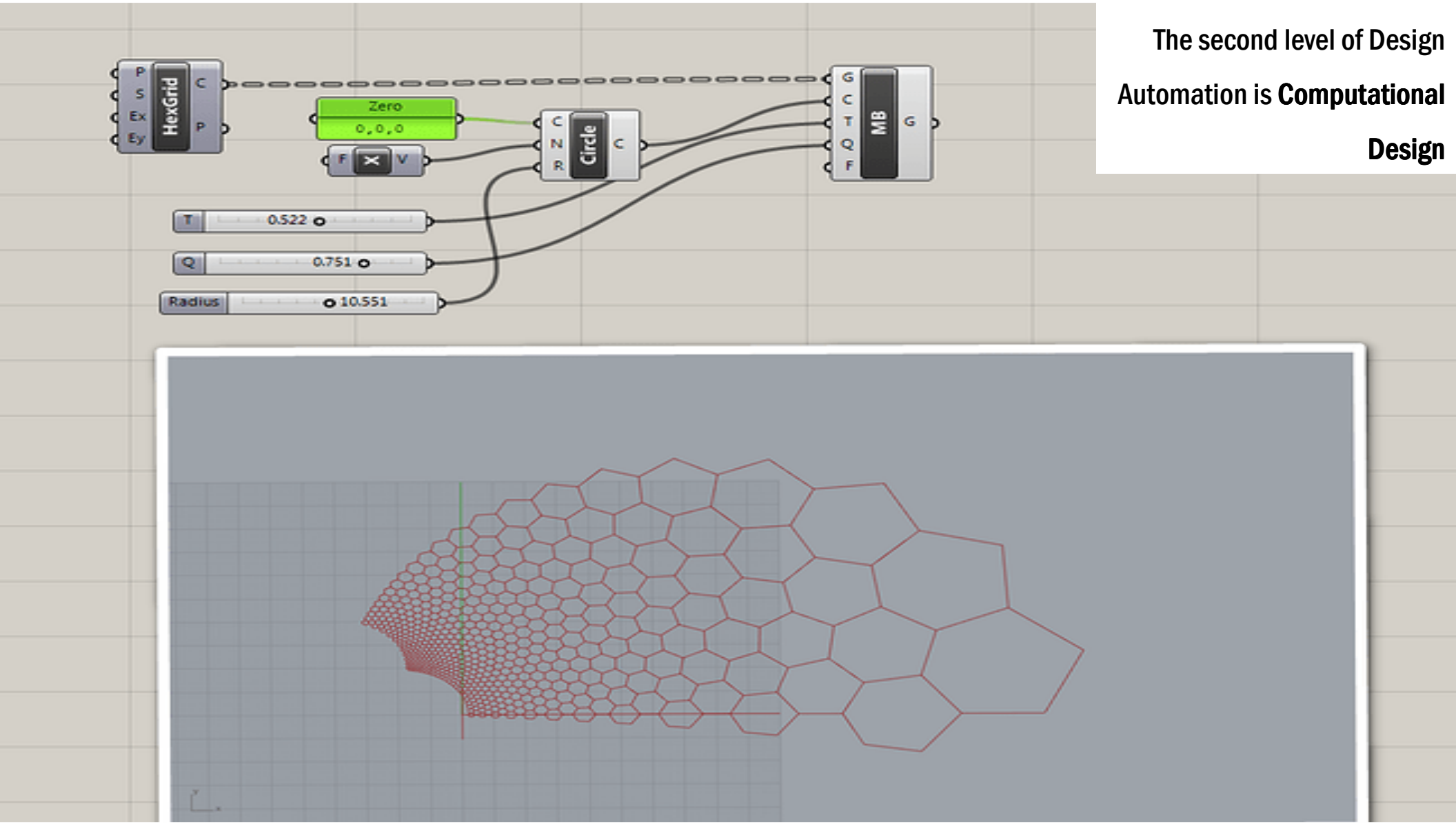

Levels of Design Automation

The first level of Design Automation is **Parametric Modeling**

A typical example is BIM Objects

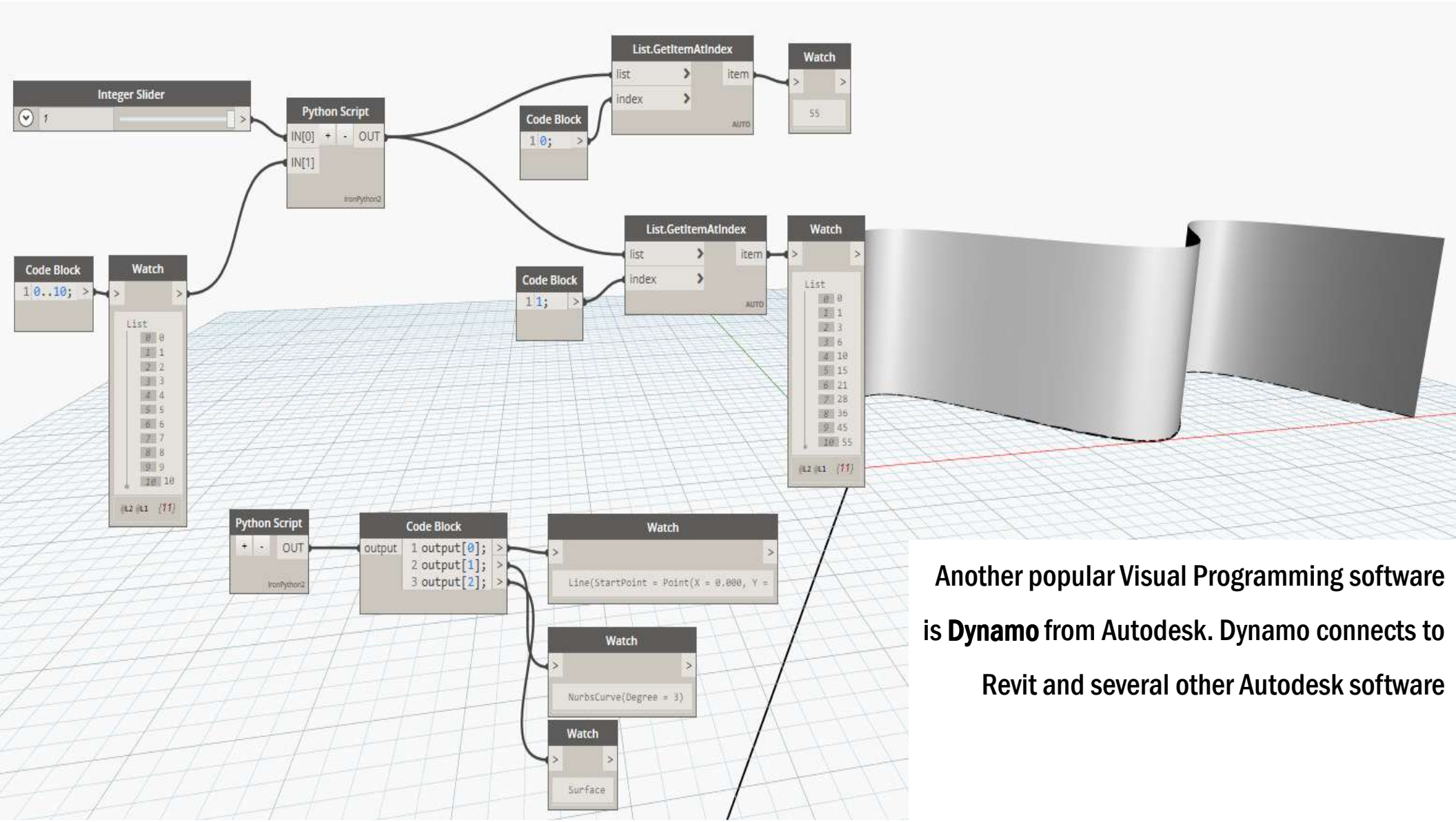
- A BIM Object can be created to change in size in the three axes - x-,y-,and z-.
- Conditional Logics can be used to control the visibility/behaviour of the parts.
- Formulas can control arrays which controls elements as dimensions change.
- The materials can be changed with the use of parameters.
- Types and families can be swapped with the click of a button
- Custom and Shared Parameters can be created to meet peculiar design needs.

The second level of Design Automation is **Computational Design**



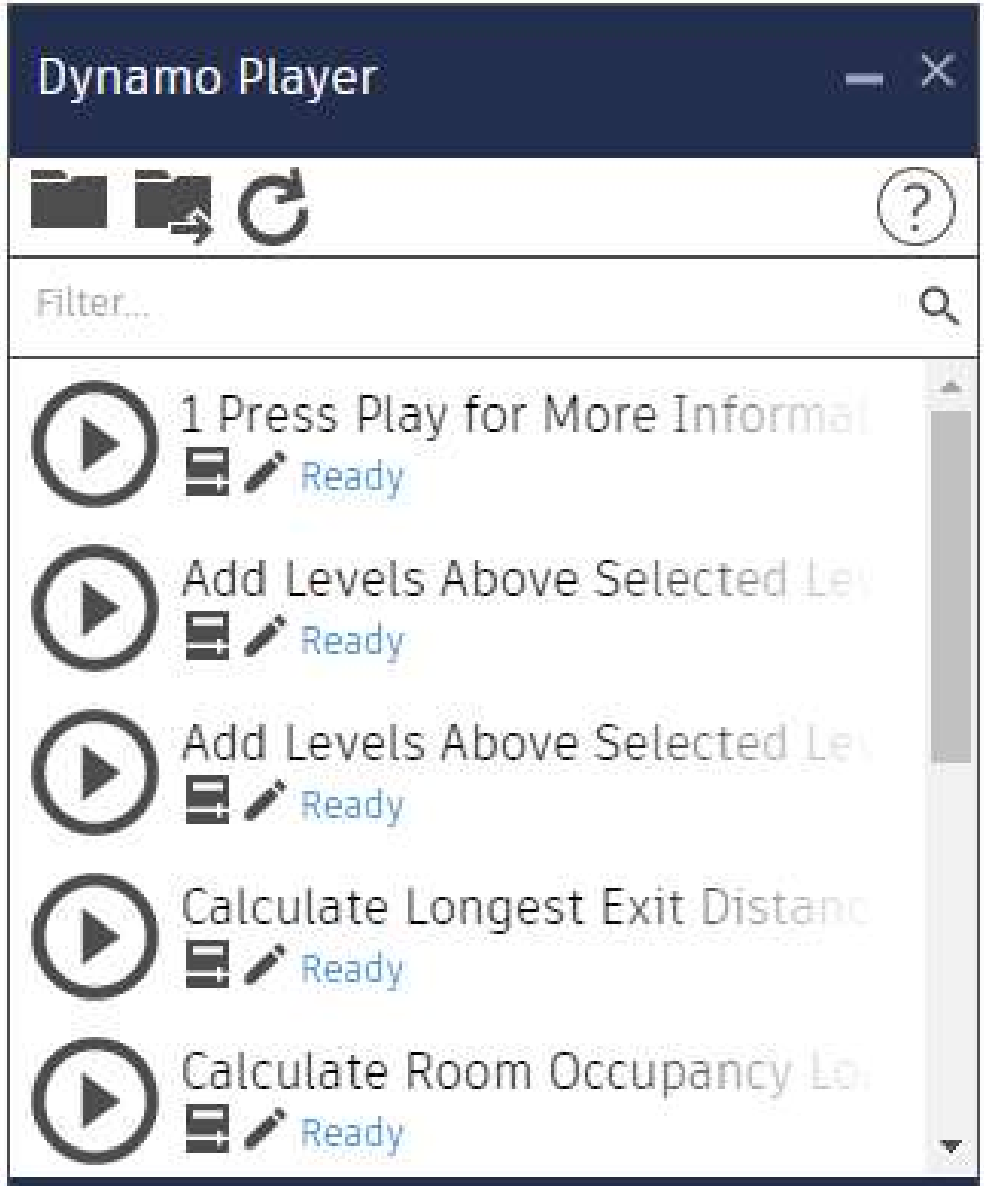
One of the first visual programming languages to enter the Architectural Design space is Grasshopper, a plugin for Rhino software

With Grasshopper, a Generic tool such as Rhino suddenly becomes a Parametric tool. That is the power of Computational Design



Another popular Visual Programming software is **Dynamo** from Autodesk. Dynamo connects to Revit and several other Autodesk software

Beyond Design Conceptualization, a major application of Computational Design is Design Automation

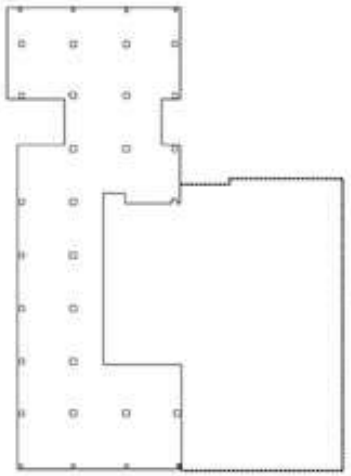


Within Revit, the **Dynamo Player** plugin executes dynamo scripts for Revit without having to access the Dynamo interface.

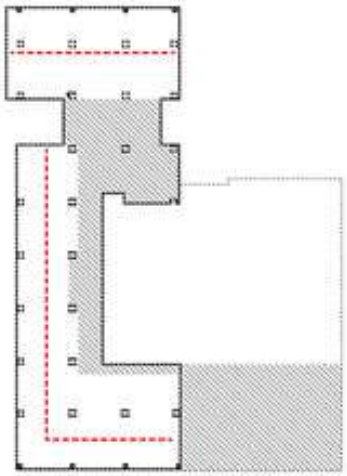
Companies write scripts to automate all their redundant tasks to speed up their documentation workflow

Other third-party Design Automation tools come mostly as plugins to BIM Modeling tools, such as Revit. Simply visit the app store and search for "productivity" tools. Some are free; some others are paid

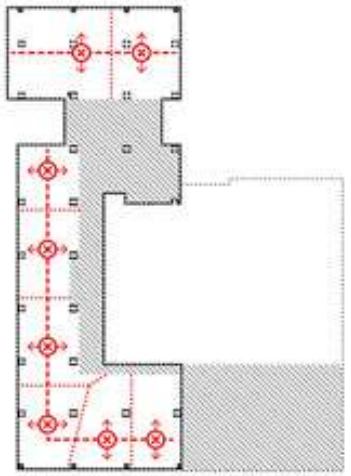
The third level of Design Automation is **Generative Design**



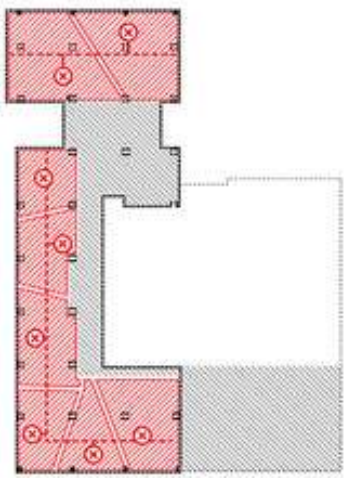
0 Initial conditions.



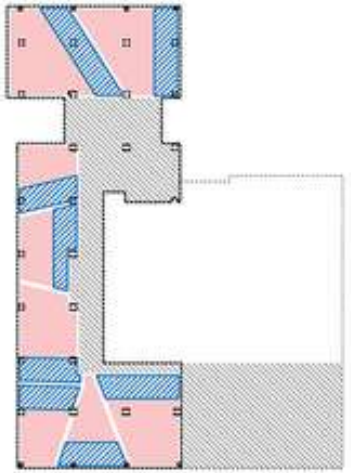
1 Definition of fixed / non-generative zones and central spine for organizing neighborhoods.



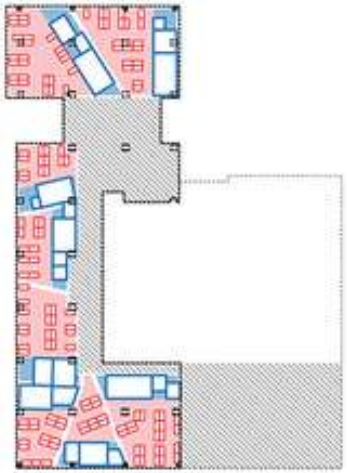
2 A variable number of neighborhoods are seeded along spine, and given a parameterized range of motion.



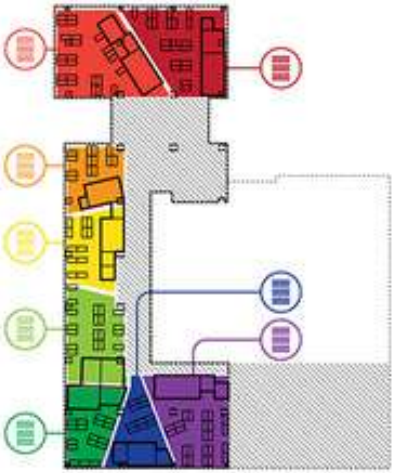
3 Optimization algorithms shift seeds along the spine creating angular divisions.



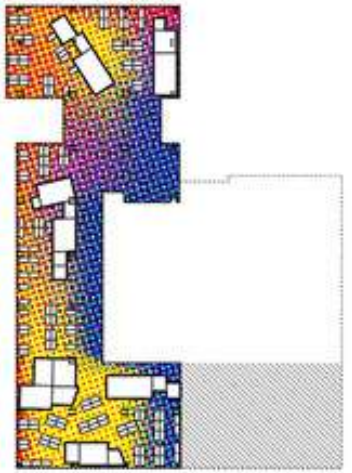
4 One edge from each neighborhood is selected to generate zone for amenity clusters.



5 Automated "test fit" generates amenity rooms from space matrix and desk layout.



6 Teams are assigned by best-fit algorithm. Neighborhood amenities are assigned by team preferences.

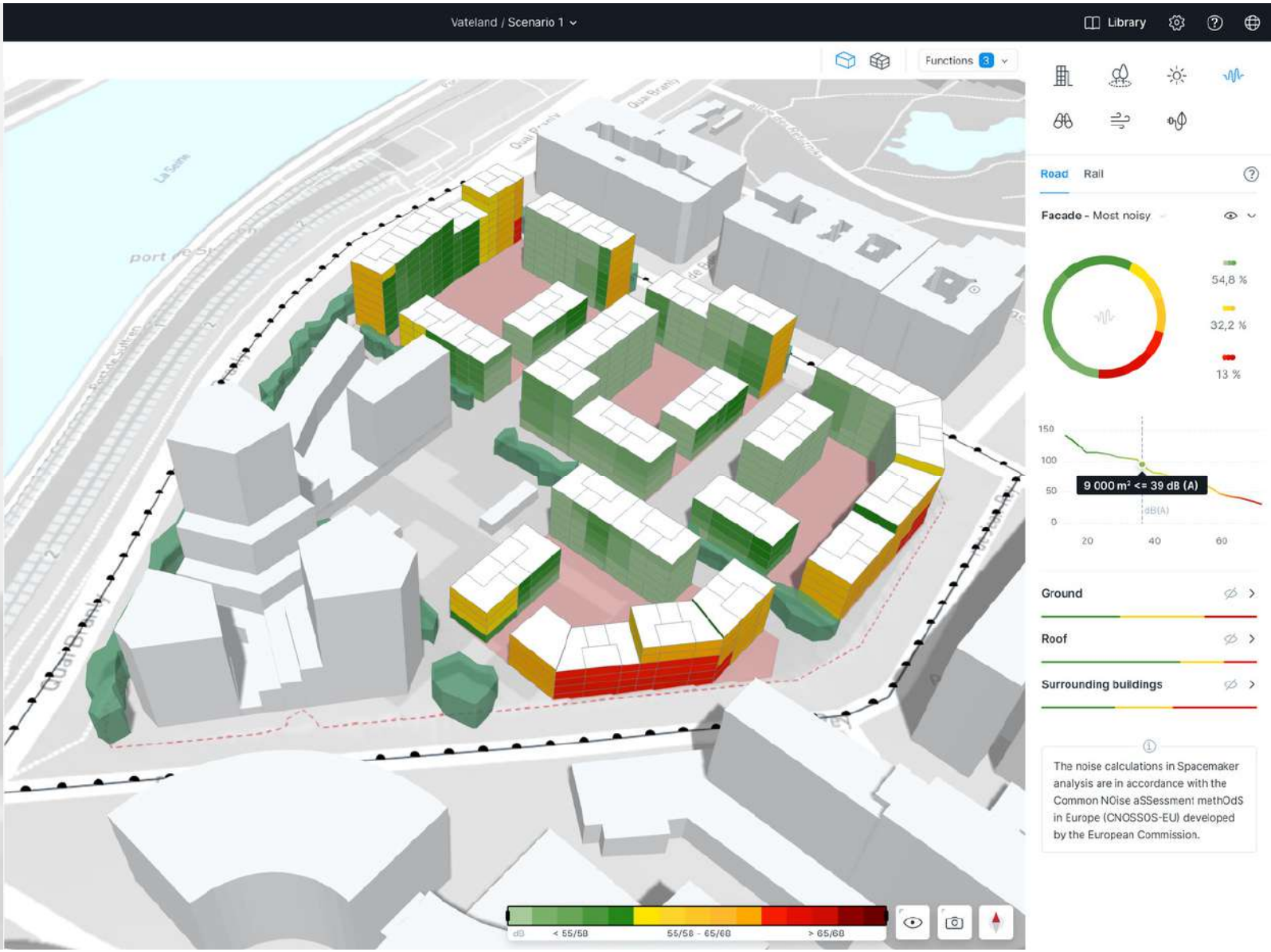


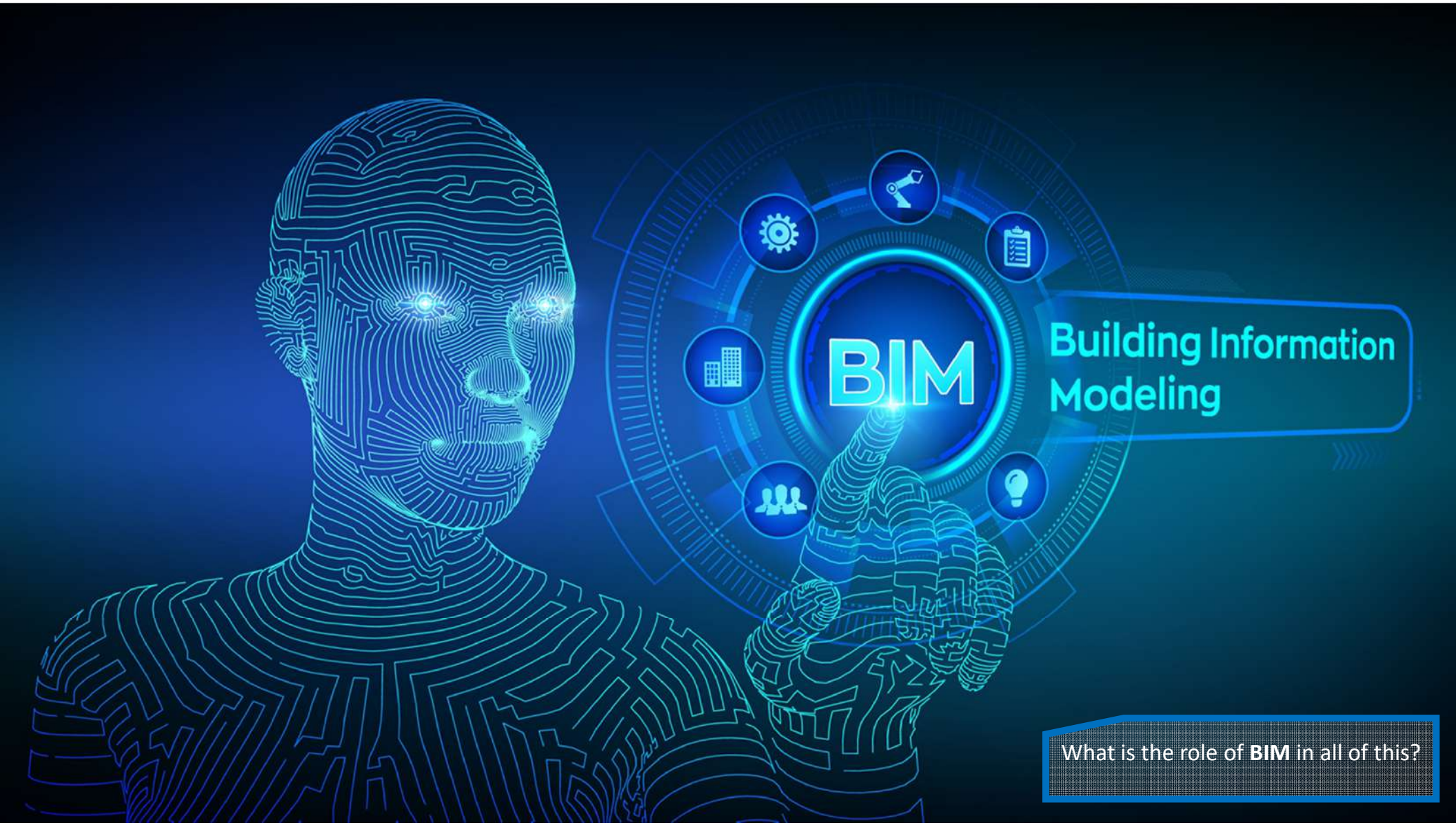
7 Evaluation engine simulates and scores each design, and returns results to genetic algorithm.

Generative Design involves three major stages

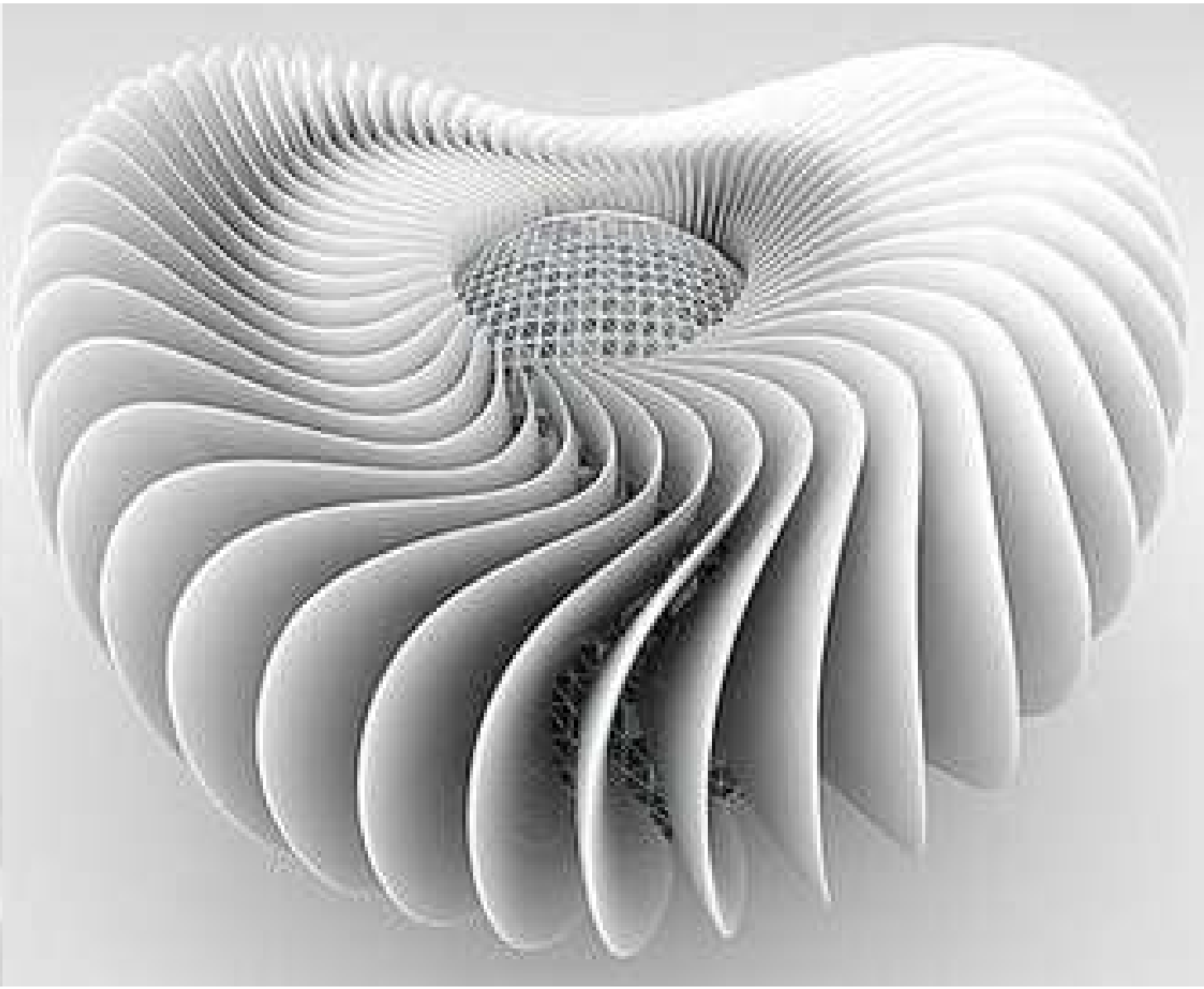
- The first stage is to **create a generative model** which can create many possible variations of a design within the constraints of a given design problem.
- Next is to **translate the design goals into objective metrics**. These metrics must be both quantifiable and computable. The priorities for the metrics need to be defined by setting each one as either an objective or a constraint.
- Next is to use **optimization** algorithms to automatically explore different options and find the best solutions. The results of the optimization can be visualised using several data visualisation techniques. Such as scatter plot and parallel coordinates chart.

- Simulation tools can now be incorporated within the generative model.
- Grasshopper comes with a built-in optimization tool, **Galapagos** - very useful for quickly testing models during the development process.
- In Dynamo, the **Refinery** plugin can run optimizations on Dynamo models.
- Revit 2021 upwards comes with a **Generative Design Primer**




BIM
Building Information Modeling
What is the role of **BIM** in all of this?

Through a BIM workflow, we can co-design and communicate in real-time with the other stakeholders on the project - including the end-users and the client



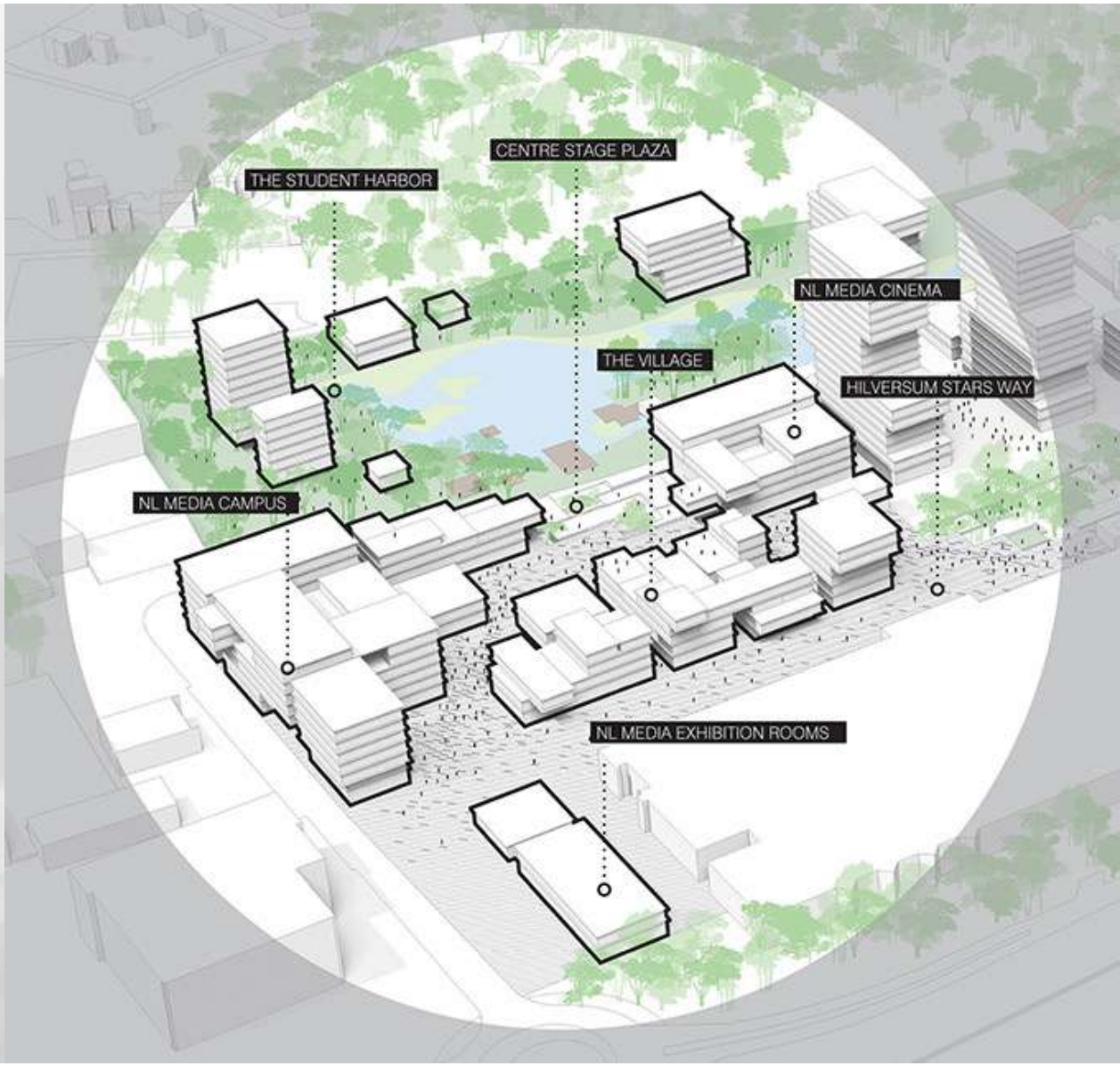
Thanks to cloud-based collaboration platforms, such as BIMx, Autodesk Construction Cloud, Procore, Trimble Connect, etc. that serve as Common Data Environment on projects today

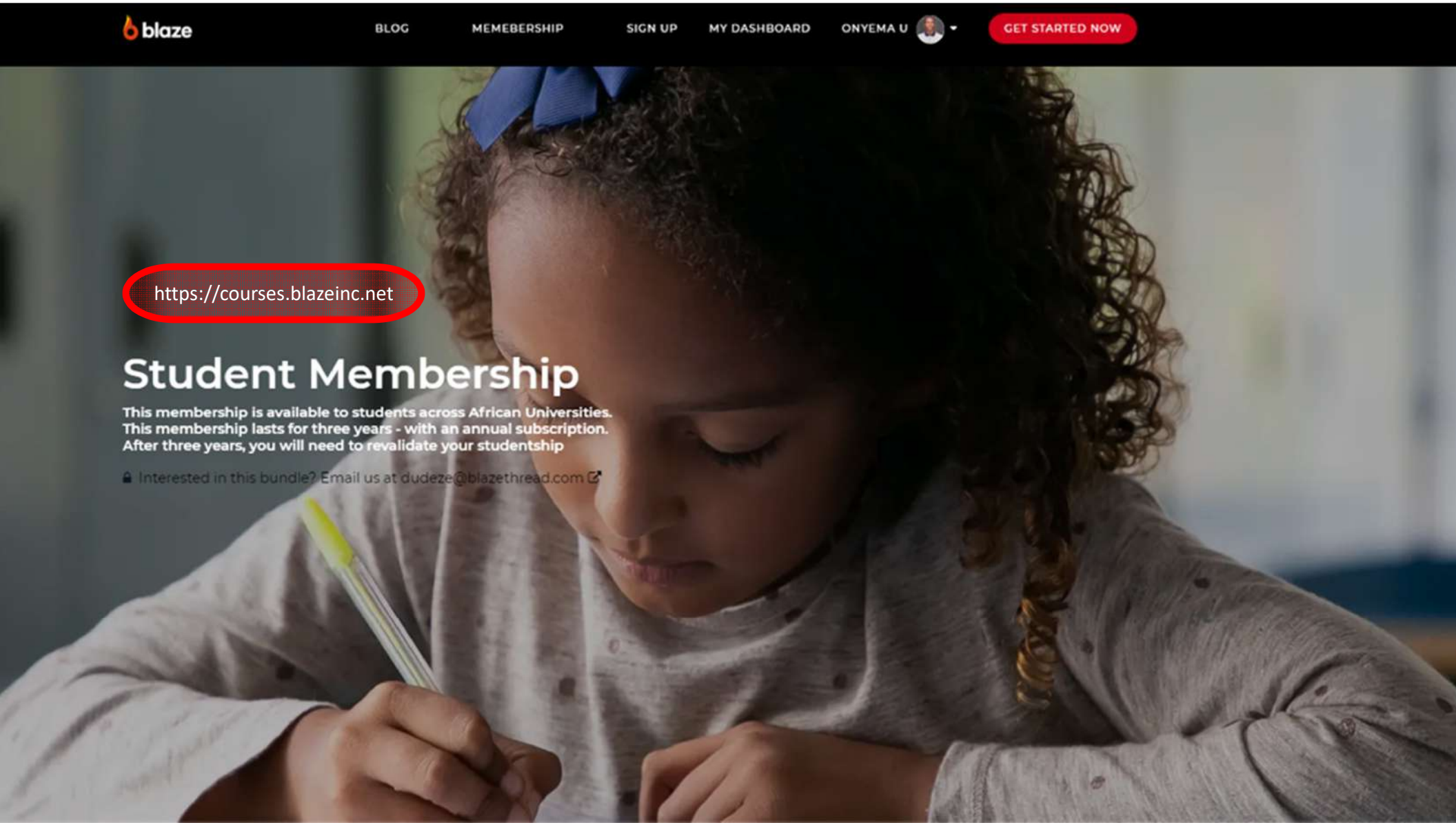
Leveraging Parametric, Computational and Generative Designs, we not only create better designs much faster, but we also create information-rich models. This makes the construction and the management of the facilities more seamless

The concept of Design Automation paints a picture of a future where Artificial Intelligence and Algorithms will replace humans entirely and take over the design process. But this is far from the truth. As we have seen,

- It takes humans to set up the metrics for design simulations, including the objectives and constraints during Generative Design.
- It takes humans to interpret the outcome of the optimisations and improve on them.
- It takes humans to write the Automation scripts, build and improve the plugins.

Over time, the role of humans in designs will likely change from the traditional design methods to a higher role of telling the computer what to do and guiding the computer all the way




blaze
BLOG
MEMEBERSHIP
SIGN UP
MY DASHBOARD
ONYEMA U
GET STARTED NOW
https://courses.blazeinc.net
Student Membership
This membership is available to students across African Universities.
This membership lasts for three years - with an annual subscription.
After three years, you will need to revalidate your studentship
Interested in this bundle? Email us at dudeze@blazethread.com

Thank You