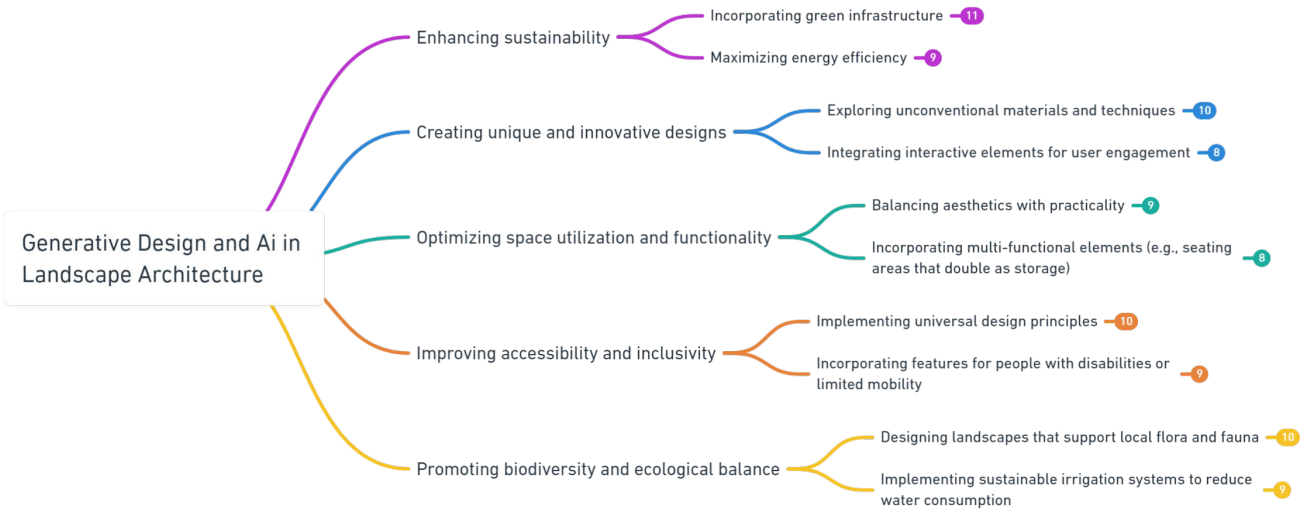
Fall 2023
GRADUATE COURSE OUTLINE

COURSE CODE: LAN3016F Section 01
COURSE TITLE: Generative Design in Landscape Architecture: Explorations and Applications
CLASSROOM LOCATION: Room: TBD
Qrcs: TBD
FTP: 2023 Fall LAN3016F
Miro: TBD
Discord: TBD
Zoom: TBD
CLASS HOURS: Tuesdays 9am-1pm,
Tuesdays 2pm-6pm,
Fridays 2pm-6pm
INSTRUCTOR NAME: Matthew Spremulli, Prof. Robert Wright
INSTRUCTOR EMAIL: matthew.spremulli@daniels.utoronto.ca
r.wright@daniels,utoronto.ca
OFFICE HOURS: By Appointment
OFFICE LOCATION: Room ES1016H, 33 Willcocks St.



Ai generated Mind map in Whimsical.

UNIVERSITY OF TORONTO
JOHN H. DANIELS FACULTY OF
ARCHITECTURE, LANDSCAPE, AND DESIGN

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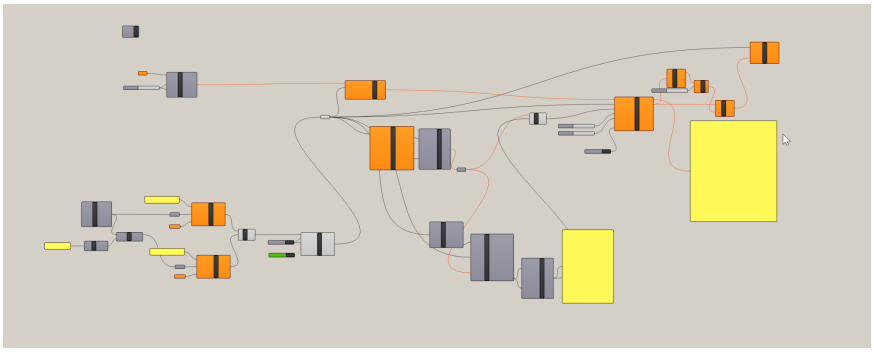
COURSE DESCRIPTION:
Generative Design in Landscape Architecture: Explorations and Applications is a graduate-level studio that will dive into the nexus of landscape architecture and computational design, including facets of Artificial Intelligence (AI), through the framework of Generative Design (GD).[1] GD amplifies human design potential by using computational power for iterative and informed design.

The studio's core vision is to sculpt the concept of "generative landscapes." By intersecting GD with landscape architecture, students will forge computational methods to produce diverse and inventive design iterations. Emphasizing societal needs, local ecology, and climate change, students will blend these concerns using GD techniques. The shift from traditional design to collaborating with algorithms will encourage students to reflect on evolving design dynamics. The curriculum combines theory, case study analysis, and practical experimentation, immersing students in the art of crafting generative landscapes.

The aim of the studio is twofold:
- Arm students with the skills and theoretical insights needed to harness GD in landscape architecture.
- Promote a comprehensive understanding of the prospects and challenges inherent in these methods.

The studio will challenge students to scrutinize the integration of computation, including advanced algorithms and AI, in landscape architecture. By the course's end, students will adeptly implement computational workflows in their designs and critically assess their utility and ethical dimensions. This studio is tailored for those eager to transcend conventional landscape architecture by infusing advanced tech into their design methodology.

To anchor student investigations, the studio will tackle the “generative landscapes” concept applied to a hybrid infrastructure-park case study. Drawing inspiration from the Land Art Generator Initiative (LAGI), designs will merge renewable energy attributes with classic landscape architecture elements in a public “park”. This case study exemplifies the GD approach, as it requires harmonizing performance metrics, like power generation, with other pivotal objectives.



Wave Function collapse script in Rhino Grasshopper

[1] Generative Design (circa 2020s) has become a vast umbrella term, encompassing numerous technologies and techniques used for the purpose of design automation. What unifies this growing spectrum of approaches is the application of algorithms to automatically "generate", "evaluate", and “rank” design iterations. Because of the inherent approach of modifying algorithms to achieve novel results Generative Design is being recognized as a *process*, where designers co-author (with technology) solutions. Zach Kron 2021 Autodesk Inc.

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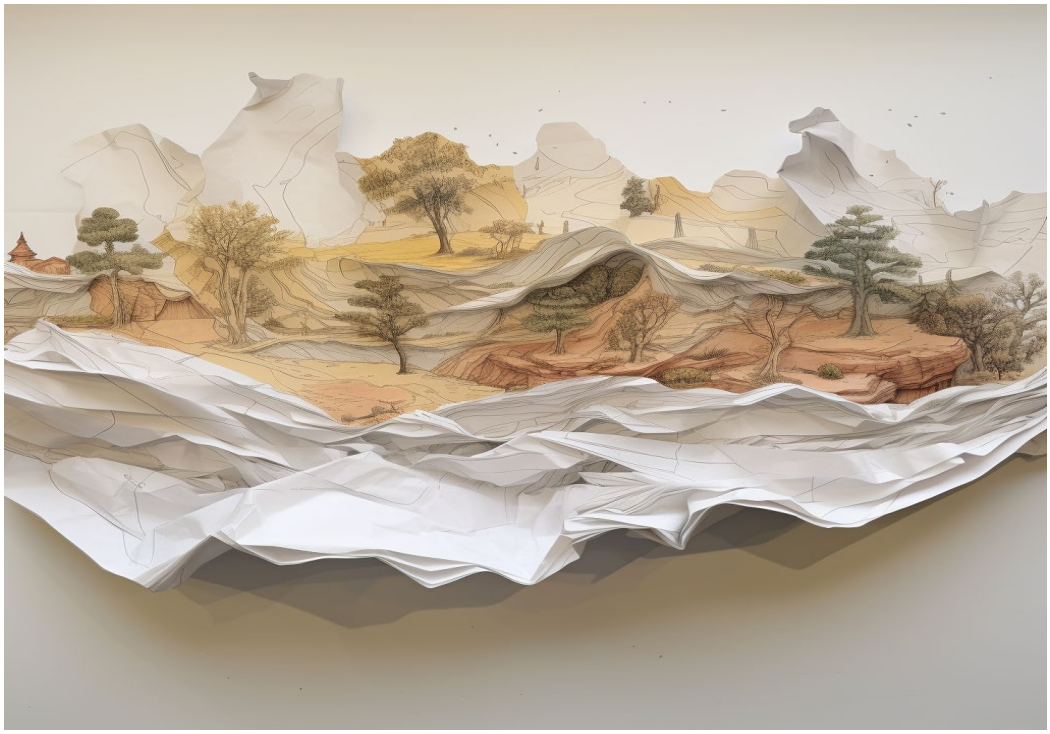


Lidar scan of crumpled paper and Midjourney landscape image-based generation.

COURSE OBJECTIVES:
The four learning objectives for students of this studio are:

1. Contextual Framing (Awareness)
   By the end of the course students will:
   - gain a foundational understating of how GD technology has emerged in a contemporary ~2015+ era
   - understand the principles and theories underlying Generative Design (including methods that involve AI), especially as they relate to landscape architecture
   - gain an understanding of the current opportunities, challenges, and ethical implications of using Generative Design (including methods that involve AI) in landscape architecture, recognizing both their transformative potential and their limitations

2. Anatomy (Tools/ Skills / Techniques)
   By the end of the course students will:
   - have been exposed to and experimented with a variety of computational-design tools and techniques that comprise GD workflows
   - understand some of the underlying parameters (anatomy) that comprise GD methods, and will be able to start to control these parameters
   - have the technical acumen required to apply GD methods in their future academic projects and/or professional practice

3. Informed Application (Critical Consciousness)

By the end of the course students will:

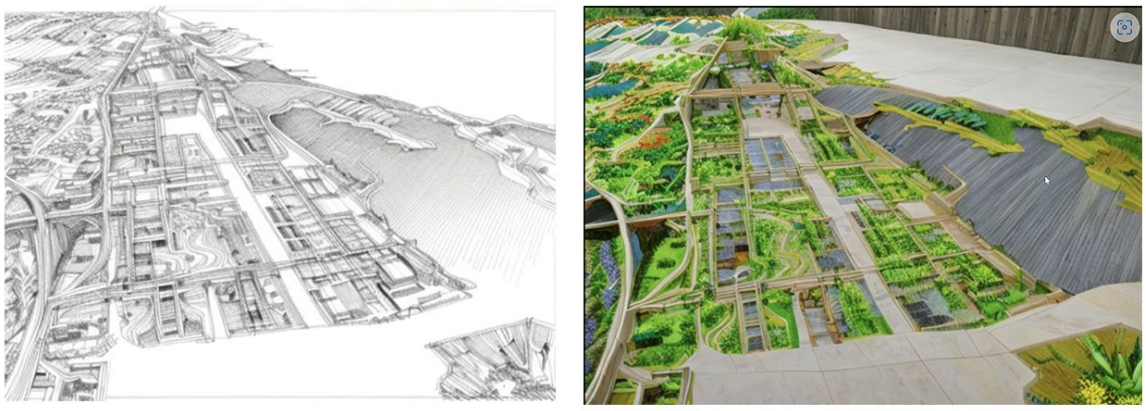
- become conscious of *when* and *why* to leverage specific GD methods for specific design iteration tasks … and when not to!
- be able to select, mix, and apply various forms of GD techniques to create generative landscapes, demonstrating competence in using these advanced technologies in the design process
- be able to incorporate numerous considerations including (but not limited to) local ecology, climate change, and societal needs into their generative landscape designs, demonstrating an understanding of the complex factors that influence an intentional performance-based design

4. Communication (Representation)

By the end of the course students will:

- be exposed to different techniques and methods for communicating the rationale, use, operation, and potential benefits of GD technology with stakeholders
- start to develop their own style of communicating GD benefits to audiences
- be able to effectively communicate their design ideas and the rationale behind them, both in written form and visually, showcasing their generative landscape designs and the AI methodologies employed.

ESRI City Engine Automatic 3d terrain and model of Portland's Toronto



Toronto Portland's Sketch to Render in PromeAi.