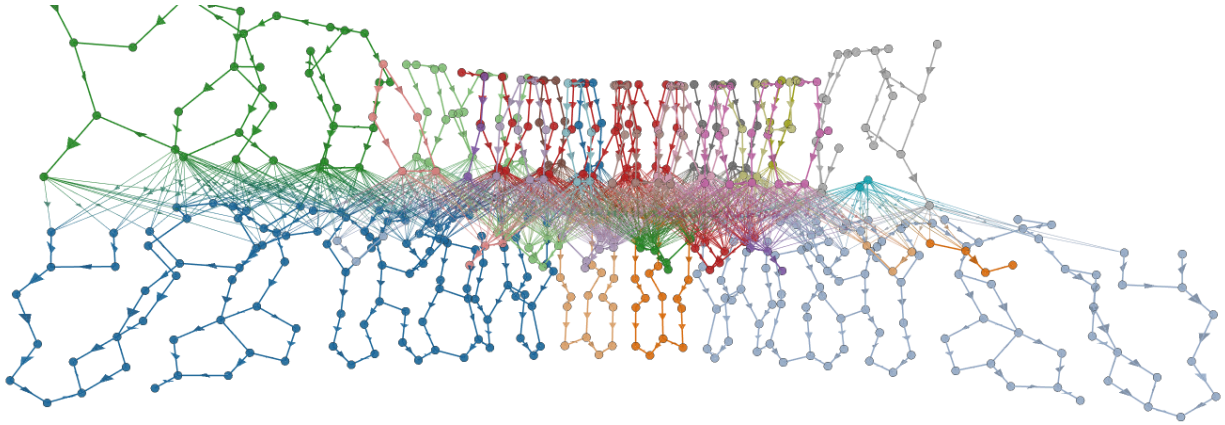
Taubman College of Architecture and Urban Planning | University of Michigan | Winter 2025 | ARCH 709 & ARCH 825 Advanced Computational Geometry | Fri 1:00-4:00pm | 3154 A&AB| Dr. Mania Aghaei Meibodi | meibodi@umich.edu | https://dartlab.umich.edu/ | https://www.instagram.com/dart.umich/



Integration of Graph Theory in the Design and Analysis for Additive Manufacturing. DART's Doctoral Researcher: Abdallah Kamhawi. Advisor: Dr. Mania Aghaei Meibodi.

ARCH 709 – Advanced Computational Geometry

The Advanced Computational Geometry Course provides a deep dive into computational geometry and design, focusing on programming, algorithms, and geometric principles to create complex geometric models. Students will gain both theoretical knowledge and practical skills in computational methods and geometric concepts. Through hands-on projects, students will explore topics including computational geometry, differential geometries, meshes, Python programming, recursion, object-oriented principles, and advanced subdivision techniques. Students will develop expertise in designing computational geometries using Python. To enhance programming and problem-solving skills, the course leverages AI-powered large language models (LLMs), teaching students to collaboratively co-design scripts with AI. The goal is for students to achieve digital literacy and critical thinking skills to understand the potential and limitations of digital tools and make thoughtful decisions about their use. The course combines lectures, hackathon workshops, and readings, integrated with project-based work to progressively inform and advance students' learning. Students will work individually and in small groups. Each exercise builds on the previous one, and as the course progresses, students will apply their knowledge to a comprehensive final design project.

Prerequisite: Intermediate knowledge of Rhino and Grasshopper is required. Students should have completed Arch 509: Computational Design or possess basic Python skills, including syntax, data types, variables, functions, arguments, loops, and conditional statements.

Students must bring a laptop equipped with Windows, Rhino 7.0, Grasshopper, and necessary software. Additionally, midterm and final assignments will involve 3D printing.