This project investigates how folding shading devices can adapt to changing daily and seasonal daylighting conditions. It combines material manipulation, parametric modeling and digital analysis to understand how different design lenses can be fruitfully combined. Rhino Grasshopper modeling has been used to adjust 2D lasercutting patterns and simulate 3D folding kinetics, with Diva and Heliotrope plug-ins for solar simulation. The project is comparing physical and digital methods for optimizing lighting and thermal performance in shading design. The larger goal is to develop recommended physical-digital workflows that stimulate creative thinking and supports sound design decisions.

The group will begin by reviewing folding techniques and Grasshopper methods used to date. Then students will target a specific area of focus:

- **Fabrication**: Material cutting, forming and connection methods for large-scale interior or exterior application
- **Simulation**: Testing and optimization of thermal and lighting performance
- **Structures**: Methods for self-support or mounting, spatial opportunities for temporary shelters
- **Kinetics**: Manual, pneumatic or electronic sensor activation of folding

Participants will be expected to study background material and work through online tutorials to get grounding on the project, then show evidence of effort and contribute to group discussions on a weekly basis. Progress for the term will be summarized either in an individual short illustrated report or in a jointly authored research paper draft for publication.

Nancy Cheng directs the Architecture Department’s Portland Program. Fascination with how individuals think and interact drives her research and teaching. She studies the design process, focusing on digital technology for innovation and tactile processes for creative engagement. At University of Hong Kong ’93-’96, she connected global partners in Virtual Design Studios. Teaching at Oregon since ’96, she uses social media to cultivate learning communities, linking students designing green buildings and communities with local and remote experts. Cheng has headed the Association for Computer Aided Design in Architecture, the national AIA Technology in Architectural Practice group, and the 2004 AIA-ACADIA Fabrication conference.