Toward Climate Change Adaptation: Integrated Kinetic Facades
ARCH 7104 Diploma Studio Spring 2019 Prof. Kyounghee Kim (kkim33@uncc.edu, Rm 227)

[Promise] We live in an era that faces global challenges of climate changes and resource depletion. With the rapid urbanization and growing energy consumption in the built environment, building facades become ever more important in architectural practice and environmental stewardship. There has been an increase in the integration of kinetic facades in contemporary buildings due to its environmental potentials and aesthetic construction. The kinetic façade is becoming an independent system of the building, transforming the design methodology to sustainable building solutions.

[Problem] Building envelopes in contemporary buildings play an important role as a micro-climate controller and an aesthetic performer. One of primary problems of contemporary building enclosures is its “static” nature in relation to its “dynamic” environment. The studio focuses on kinetic building enclosures that correspond to dynamic environments in space, program, time, and occupancy to balance multi-faceted design requirements.

[Objectives] This Diploma studio focuses on the design of a multimodal kinetic façade system. The studio activities consist of desk survey, parametric modeling, performativity measurements, prototyping, discussions, lectures, pin-ups, and reviews to maximize two primary learning objectives:

- The studio serves as a summative experience for the professional MArch degree.
- Design a project that exhibits conceptual, formal, aesthetic, technological and experiential clarity, criticality and sophistication, as it pertains to varying instructor-led themes.

[Project] The project is a community hub integrated with kinetic facades that contributes to innovations and vibrancy of the city of Charlotte. Kinetic façade system(s) should enhance microclimates of the built environment, economy, energy production, CO2 reduction, and/or user well-being, focusing on one of the followings. Kinematics of kinetic façades consider six degrees of freedom and shifting to address design goals of thermal, illuminous, air-flow, and user responses as well as aesthetic quality. The project should create a compelling narrative for promoting the triple bottom line of sustainability for the city.

- **Active kinetic façades**: active systems deploying to predictive measures and/or real-time measures
- **Passive kinetic façades**: material systems passively responding to heat, air, and moisture (HAM).
- **Bio kinetic façades**: biomimetic responsive systems following functional strategies found in nature.

[Evaluation] This project is evaluated on architectural design quality, relevancy, and caliber of execution. The distribution of cumulative course assignments are as follows:

<table>
<thead>
<tr>
<th>Assignment Description</th>
<th>Weight for Course (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design project activities (total)</td>
<td>85%</td>
</tr>
<tr>
<td>Formal project presentations and documentation</td>
<td>15%</td>
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<tr>
<td></td>
<td>100%</td>
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</tbody>
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[Bibliography]

- Detail Manual Books