

Alex Porter
ARCH 410 Light and Shadow

Proposal for ARCH 423 credit:

Parametric Process and Daylighting Design

For ARCH 423 Media credit I am proposing a daylighting analysis of a multi-purpose space within my terminal project. The SW facing space is multi-purpose meeting and event room with a strong relationship to a prominent campus square. I would like to investigate how a panelized external shading system can create delight and a sense of time while reducing glare and the need for electric lights within the space.

Based on my past experience with physical daylighting models and HDR photography in studio with Ihab Elezyadi I want to move towards computational design as a means to develop these concepts in more detail and precision. My goal will be to create a variety of lighting levels within the space without creating glare. In other words the shadow boundaries should be blurred to a certain degree. On a cloudy day these blurred boundaries emulate the rolling light of the passing clouds, and on completely sunny days they create dappled shade.

I will take solar data for Salem Oregon on March 21st as a baseline for these studies. As a starting point I will define densities within the field of the façade that create a range of daylight factors within the space. These densities will be represented in an elevation drawing that will serve as the basis for parametric rules. The elevation drawing will then be divided into 1'x1' squares with each square assigned a specific opacity based on the overall desired density. This information will then be modeled simply in Ecotect in order to refine the initial drawing so that certain areas receive appropriate lighting. (for instance 90 fc for reading small text if that was to be a designated use)

These studies will lead to the production of a 2'x6' panel consisting of 12 squares. Max/Min and True/False statements can be defined for each square to achieve the density requirements. The boundary condition between each square, and the relationship of each panel, is an interesting consideration that dramatically changes the aesthetic of the project. The integration and exploration of that concept will rely in large part on my ability to understand and operate the software within a reasonable amount of time.

Prototypes can be developed on a 3D printer, and a final 2'x6' panel will be fabricated in wood or Corian on the CNC. At the conclusion of the course I will provide an essay on my process and the potential for further research, 1500 words with illustrations.

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SCHEDULE:

I will follow the ARCH 410 Light and Shadow Syllabus until the 4th week of the term. A copy of the ARCH 410 schedule is attached, my schedule differs in the following way:

Week 4 - Scale prototype (CNC or 3D print) of the 2'x6' screen will be made available for class review.

Week 5 – Several scale iterations will explore the digital process and material selections. These will be presented for discussion and a final material for the 2'x6' screen will be selected at this time.

Week 6 – Work in progress, update to class.

Week 7 – Work in progress discussion – as per 410 class schedule

Week 8 – Final panel milled and ready for presentation (possible installation in White Stag)