

“Research: The Opportunity that yields a Threshold of New Beginnings”

For most, the perception of research is rather negative—bearing imagery of a maze of silent library aisles leading to an intimidating librarian waiting to aggressively “sssh” your unintentional clamorous movement. But for me, research was an opportunity— an opportunity that evoked a threshold of new beginnings through knowledge that was yet to be obtained.

The birth of this study predated within my Arc 211: Intro to Landscape & Urban Design course two years ago. Here I was introduced to heliostat technology. Immediately, the exploration of this topic blossomed giving me the opportunity to research this topic last fall during my enrollment in Arc 406: Sustainable Design Case Study. The goal of this project thus became: to gain an understanding of the role of technology and the sun through establishing the relationship between solar radiation and its impact on our everyday lives. Principal focus, sure enough, was placed on heliostat technology.

Preliminary research efforts consisted of me narrowing down what was educationally necessary. To organize my search, I created bubble diagrams of words/phrases that sparked inceptive ideas: “natural daylight”, “radiation”, “mirrors”, “solar tracking”, and a litany of other combinations. Through collaboration with my professor, Mary Ben Bonham, I was advised to explore heliostats’ relationship to nature, thus adding “biomimicry” to my list. These terms served the basis in my search for secondary sources in Miami University Libraries: Classic Catalog, OhioLink, and a plethora of other online research and academic databases.

With this core foundation, I then began organizing my findings. Soon I realized that simply searching the term “heliostat” produced a range of vague results. For refinement, I organized my original key terms into a functioning outline; thus a concrete direction was ensured amidst my research process and subsequently, my papers commencement. From this list I returned to search for reputable sources utilizing EBSCOhost, the Avery Index to

Architectural Periodicals, JSTOR and databases alike. These outlets offered promising secondary sources that provided essential background history on the technology, its function and relationship to natural phenomena.

This became the premise of my first section: Architecture in the Natural World. I utilized my results to explore the influences nature shared in serving as precedents for our built environments. Pawlyn's *Biomimicry in Architecture* detailed this "abstraction of good design from nature." He severely strengthened my thoughts on the relationship between the sunflower and heliostats, for the heliotropic tendencies within sunflowers were evidently reproduced within the systematic features of heliostat technology. Thus, through analysis of the sunflower's characteristics, I sought to understand its connection to solar path and the direct implications/role the sun plays in the rate in which heliotropism occurs.

Henceforth, solar radiation, both indirect and direct, was observed through collecting detailed text studies — such as *Framing Daylight* and *Daylighting for Sustainable Design*— that outlined the core benefits of these solar gains. Such texts served to build the understanding of the importance of heliostat technology, ensuring how its benefits, in retrospect, outlined the progressive urban sustainable movement. However, with the introduction of light come drawbacks in terms of location, weather, and climate. I therefore evaluated sources based on their approach to this concept, for it was necessary to receive a holistic interpretation of all the elements that came together to create this sustainable device.

Even more appreciated were text sources found within the book stacks of the Wertz Art and Architecture Library in Alumni Hall, for they offered core examples of heliostats introduction within design. These collections of case studies exhibited heliostats' progression from—what I previously learned—as its astronomical conception, then as a handheld reflective device and now as an integrated part of building daylighting strategies. Explaining this

transition fully pose the most difficulty for each heliostat created for these precedents were designed differently to fit the buildings unique needs.

To narrow down these precedent samples, I resorted to using a key tool offered by our university libraries: live online assistance. Efforts made by Stacy Brinkman, the librarian, also helped for our session fully introduced me to the library databases and what they offered. Ergo, not only was I able to seek help physically from her when in search of a particular book on the shelf, but also, while at home rummaging through the online databases, I was able to receive adept feedback and guidance from any librarian staff who were more apt at using these resources than I. The identification of these case studies hereafter played a vital role throughout my research development as it represented heliostats advances, from its past intergradation in the Reichstag Building renovated by Norman Foster, its present benefits within both Genzyme Headquarters by Behnisch & Partner and One Central Park by Jean Nouvel, to its future in the development of The Voorburg Twist.

Undergoing these riveting steps posed purpose and direction to my research process. Fittingly, I owe the discovery of my sources to the proper execution of overlooked research strategies. These strategies included the typical search of books, articles, and other materials, but also the concept of exploiting bibliographies to find background information and context. Combined, these key elements and more laid the groundwork for a strong research assignment as follows: Part I outlining the natural influence of technology and the natural world through evidence of heliostat's heliotropic tendencies. Part II investigating heliostat's historical origins and impacts from various perspectives. Part III instilling the sense of architectural integration, establishing the reality of use, benefits, and incorporation into our urban landscapes. Finally, lay the defining moment—titling the piece I've worked vigorously on throughout the past semester. Here lied the pondering question, "Dare to be a Wildflower?" ...and so it stuck:

Dare to be a Wildflower:

Looking to the Natural World for Answers through an in depth study of Heliostat Technologies.

Culminating the end stages of my research, to effectively communicate my findings after my paper, I conducted an oral presentation via my educational poster deliverable. However, after ARC406 my research didn't end. I have continued growing this knowledge throughout my current architecture studio project, and this summer I will continue this research journey conducting an Undergraduate Summer Scholars (USS) project. Perhaps this too makes me be a wildflower, as the seeds of my research continuously blooms wherever I may drift. And for that, I am content.