TEACHING-LEARNING-RESEARCH: DESIGN AND ENVIRONMENTS

• Paper / Proposal Title:
Biophilic Net-Positive Architecture: An Integrated Design Studio

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• Abstract (300 words):
This paper discusses the curricular objectives, exercises, design tools, methods, and outcomes of a 7-week graduate architecture studio that explored a biophilic approach to net-positive design. We may be well aware of the performance and pragmatic aspects of net-positive design, but what are its poetic, atmospheric, and experiential implications? Could aesthetics, beauty, health, and well-being be as important to net-positive architecture as are reducing waste, energy consumption, and environmental impacts?

Biologist E.O. Wilson “Biophilia Hypothesis” suggests that there is an “innate emotional affiliation of human beings to other living organisms.”¹ A biophilic approach to net-positive design encourages students to investigate the intersections between natural systems, habitat, environmental forces, passive strategies, and health and wellbeing. A biophilic approach to net-positive design provides an opportunity to explore experiential and health dimensions of design that may not be readily apparent from a performance-based focus. Drs. MaryJo Kreitzer and Pamela Cherry of the Center for Spirituality and Healing acted as collaborators and clients and provided a building program for a proposed Center for Health and Wellbeing.

Biophilic and net-positive design were integrated using Terrapin’s 14 Patterns of Biophilic Design and net-positive guidelines from the Living Building Challenge.² ³ Tools and methods included physical and digital models, envelope details, sketching,
photography, time-lapse video, and qualitative and quantitative analyses. Poetic, pragmatic, and performance-based issues were considered through six exercises: 1) Biophilic Site and Building Journey, 2) Biophilic Massing & Passive Potential, 3) Biophilic Section & Envelope, 4) Biophilic Structure & Materials, 5) Biophilic & Responsive Envelopes, and 6) Design Integration. The discussion provides teaching exercises, methods, and tools to engage students in the simultaneous exploration of biophilic and net-positive design strategies, including: 1) integrated passive and renewable approaches to net-positive and biophilic design, 2) strengths and limitations of design integration, and 3) design metrics and tools.

REFERENCES

• Author(s) Biography (200 words each):
Mary Guzowski is a Professor in the School of Architecture at the University of Minnesota where she teaches and conducts research related to daylighting and sustainable design. Her continued fascination with daylighting, the natural environment, and ecology has shaped her architectural research and teaching. Her publications include the books The Art of Architectural Daylighting (Laurence King), Towards Zero Energy Architecture: New Solar Design (Laurence King) and Daylighting for Sustainable Design (McGraw Hill), a variety of web-based design resources, and scholarly and professional articles. Recent research has focused on aesthetic and ecological innovations in daylighting, solar architecture, and net-zero design. Mary has received educational awards from the American Institute of Architect’s Committee on the Environment and American Institute of Architects Minnesota for her work in ecological design education.