High-Performance Glazing for Energy-Efficient and Bird-Safe Buildings

**Objective:** With the ultimate goal of reducing bird-window collisions, identify a short list of energy-efficient glazing products that also successfully address bird-safety, test these top-performing products using mock-ups, and recommend the best solutions.

**Background:** Two disparate sustainability concerns are increasingly being linked—improving the energy efficiency of buildings, and preventing bird deaths. What brings them together is of course building glazing, i.e., the use of window panes in building facades. Some think that from a strict energy-efficiency perspective, less glazing on buildings would be preferable. But it is unlikely that our affinity for highly-glazed buildings will end soon. Meanwhile, close to a billion birds are killed annually by collisions with windows in the United States. The bird casualties are attributable to the high reflectivity of glass, which in effect creates simulations of habitat attractive to birds. Also, birds fly into transparent windows on building corners, mistaking them for unobstructed passageways. Awareness of the issue is growing, but the construction industry—and especially glass manufacturers—are waiting for signals from the market, and for guidelines on bird-safe glazing specifications. One way to encourage movement in this area may be to focus on synergies to be obtained if architects specify energy-efficient glazing solutions that also address bird-safety. For this, it would be quite useful to have available a set of glazing solutions that may solve for both problem states—i.e., a set of glazing typologies that improve energy efficiency while eliminating or reducing the reflectance and/or transparency that invite bird-window collisions.

**Suggested Approaches:** During the research phase, investigate bird-safe glazing to identify a range of current and emerging possibilities (e.g., exterior shading devices, etched patterns in the glass, applied glazing films, metal oxide films, and low-reflectance glass); research the performance of currently manufactured energy-efficient glazing; and examine the range of currently manufactured exterior shading projects (e.g., fixed or louvered shading, overhangs, light-shelves, or double-glazing with integral shading). During the data-assembly phase, assemble data on common types of glass curtain walls and glazing types and compare such key factors as U-values, R-values, reflectance, and other attributes that may affect either energy or bird-safety performance; present this information in matrix form; and create a short list of 5-10 top performers for further study. During the testing phase, determine test methodologies and protocols, conduct tests involving mock-ups of the top performing products (under the various conditions specified in test protocols), develop a consistent format for reporting results, and write up recommendations from these tests for possible publication. During final research phase, attempt to quantify the costs/benefits of prototypical building retrofits with energy-efficient bird-safe glass and/or shading devices.