Architecture for the Birds

a collaboration between:

Institute for Ecological Design | School of Architecture and Urban Planning

Team:
Prof. Filip Teichman
Prof. Mike Utzinger
Jacksob Leverenz (Research Assistant)
Collin Tanner (Research Assistant)

Department of Geography | College of Letters & Sciences
Prof. Glen Hedlund
UWM is located approximately 3 miles northeast of downtown Milwaukee.
This area is primarily a dense suburb situated between the lakefront and the Milwaukee river.
The campus is also home to Downer Woods, an undeveloped natural area that provides a respite for students/faculty and a habitat for nesting birds.
The School of Architecture and Urban Planning (SARUP) is near the approximate center of campus and is one of the most lethal buildings according to the bird-strike tracking and reporting that is done by Prof. Glen Fredlund and student volunteers from the UWM Dept. of Geography.
Prof. Glen Fredlund has been mapping the locations in which dead birds are found along the exterior perimeter of SARUP. Every year there are between 50-100 bird deaths (due to collision with windows) caused by this building alone.
There are two zones or areas of the building that experience a higher concentration of bird collisions.
The courtyard, which has a glass envelope on the Northern and Western facing sides is one of these areas.
The other is an exterior alcove on the eastern facade that faces N. Maryland Ave.
UWM has recently awarded members of the Institute for Ecological Design (Prof. Filip Tejchman and Prof. Mike Utzinger) and the Department of Geography (Prof. Glen Fredlund) an undergraduate student research grant (SURF) for work that will study the conditions of campus buildings leading to bird deaths caused by collisions with glass. UWM has also provided funds to develop technologies for monitoring bird strikes and for testing retrofit solutions.
Architecture for the Birds
Interdisciplinary Research and Design at the University of Wisconsin-Milwaukee
Education  Observation  Remediation
{ Education \hspace{1cm} Observation \hspace{1cm} Remediation } \\

Now to 2 years:

1. Temporary window solutions 
2. Bird-Strike Sensor (Pat.Pending)
Bird Strike Prevention Window Pattern Design Competition
UWM School of Architecture and Urban Planning
October 17 2016
120+ Participants
Winning proposal by Asal Abdel Issa | Fabricated and Installed in late Nov 2016
Now to 2 years:

1. Temporary window solutions
2. Bird-Strike Sensor (Pat.Pending)
One of the issues that our research is addressing is specifying which areas on a facade are more likely to result in bird strikes. On multi-story buildings, finding a dead bird only gives you a general sense of where the strike occurred.
But it does not reveal the precise location...which can vary.
Another challenge to accurately tracking bird-strikes is that scavengers and predators will often remove the dead bird before it is surveyed.
Yet another issue is that a bird may strike a window, suffer a concussion and then perish in another location.
A robust all-weather bird strike sensor being developed by our team will allow for more precise data regarding bird fatalities.
**Project Goals:**
Use UWM Campus as a testing ground to develop a bird-strike sensor that will provide institutions and designers data on where to apply window/surface retrofit.

**Hardware Goals:**
- less than $20 per sensor cost
- Weather-Proof
- Small Footprint
- greater than 6-month field life

**Hardware Specifications:**
- 8-BIT ATMEAL MicroProcessor
- 256KB
- Li-ion Battery
- Piezo Sensor (Vibration Sensor)
Education  Observation  Remediation

Long-Term Permanent Solutions:

1. **Campus-wide deployment of Bird Strike Sensor**
2. Design of low-cost retro-fit strategy for all UWM campus buildings.
Retrofitting:
Sensors map most likely points for bird collision on envelope and provide baseline for where to apply retrofit.

Architecture costs are determined by cost per square foot.
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More accurate data can reduce the total cost of a project and allow for more widespread application.
Education

{ Observation

Remediation

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Retrofitting Goals:
Develop new techniques/strategies that offer a permanent and low-cost alternative to existing modalities.

Bird-Tape

Ceramic Frit
Retrofitting Goals:
Develop new techniques/strategies that offer a **permanent** and low-cost alternative to existing modalities.

**Bird-Tape**
- 3 to 10yr lifespan
- cheap
- temporary
- labor intensive

**Ceramic Frit**
- permanent
- requires window replacement
- expensive
Retrofitting Alternative: Chemical Etching using a combination of:

- Barium Sulfate
- Sulfuric Acid
- Sodium Bifluoride
- Ammonium Bifluoride

- Permanent
- Low-Cost
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Special Thanks!

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