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Occupation: Senior Planner, Dane County Department of Planning and Development
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Wisconsin Society for Ornithology
Steenbock Award Grant Application

Near-Ultraviolet Spectrum Videography of Black Capped Chickadee Plumage

Project Summary:

To the human eye, male and female Black Capped Chickadees (*Poecile atricapillus*) are indistinguishable. Researchers have traditionally relied on behavioral observations or detailed morphological measurements to determine gender for this species (Smith, 1991). This project would build on research (Mennill, Doucet, et al, 2003; Doucet, Mennill, et al, 2005; Bleiweiss, R., 2004; Smith, 1988) indicating that Black-Capped Chickadees (*Poecile atricapillus*) and other common songbirds exhibit gender-specific markings visible in the near-ultraviolet (300-400nm) spectrum.

Previous research has relied either on reflected spectrometer readings from captured wild specimens (Mennill, Doucet et al, 2003) or low-resolution video images from study skins under artificial ultraviolet illumination (Bleiweiss, 2004). This project will use reflected ultraviolet spectrum videography and photography techniques to observe live chickadee specimens in the wild, at different times of the year. This will provide an opportunity to see whether or not there is seasonal variation in chickadee plumage under UV illumination. In addition, this project should produce a useful educational tool that will effectively illustrate differences between human and avian vision.

Methodology:

Grant funds will be used to purchase appropriate filters and adapters to convert a 75mm photographic enlarging lens to a camera lens that is sensitive only to the 300-400nm spectrum (Collins, 2009; Rorslett, 2004; Weinheim, 2009). The UV-sensitive lens will be mounted to a JVC GY-HD100 high definition video camera with a sensor consisting of three 1/3" charge-coupled devices (CCD). Similar video cameras using CCDs have been shown to be sensitive to the near-ultraviolet spectrum (Bleiweiss, 2004). On a sensor of this size, a 75mm lens will yield a photographic image with an angle of view of approximately 4.5 degrees, comparable to a 500mm telephoto lens on a 35mm film camera.

The resulting UV-sensitive video camera will be set up in a blind a short distance from a backyard bird feeder known to be frequented by *Poecile atricapillus*, and photographed under natural sunlight. The camera will be operated both manually by a human operator, and by motion detection software. Resulting video images will be converted to black and white, put into the public domain, and made freely available on the internet.

If funding permits, the project will also record simultaneous video of the same birds with a second camera under normal human-visible light. This would allow for digital combination and color remapping of the two video images to produce a "false-color" simulation of avian tetrachromat vision using video special effects software (Schmitt, 2009).

Personnel:

Over the past thirteen years, Brian Standing has produced and distributed over eighteen short and feature length independent video documentaries, on topics ranging from feral cat predation on songbirds, to Wisconsin folk artists, to a Nicaraguan microcredit program. Standing's videography has been seen on Wisconsin Public Television, *Good Morning America* and at national and international film festivals. In addition to his videography credentials, Standing has a graduate minor in conservation biology from the University of Minnesota and has completed ornithological research for the Nature Conservancy.

Project Deliverables:

- 3-5 minute high-definition (1280x720, 24 frames per second) video of *Poecile atricapillus* under reflected ultraviolet illumination.
- Video will be licensed for free distribution and noncommercial use under a Creative Commons license.
- Video will be made freely available on the internet and at cost on DVD to a worldwide audience.

Budget:

Baader Venus 2" UV-pass filter	280
34.5mm to 37mm step-up ring	15
37mm to 48mm step-up ring	15
Rubber lens hood	7
Cokin P filter holder and adapter	12
Cokin gelatin filter holder	7
Ball tripod head	99
TOTAL	435

Video samples and bibliography attached.