# Frequency and Rate at Which Female Hummingbirds Tend Their Nests

David Ramirez; Dr. P. Auger, Dr. E. Strauss, M. Curley, E. Simso
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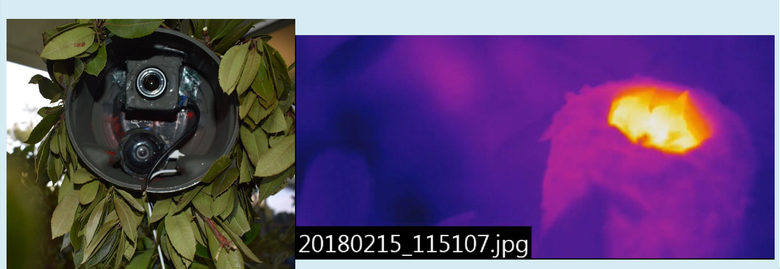
## Introduction

- In the world of animals, the smaller the body, the faster the metabolism
- Hummingbirds are the smallest birds in the world, which means they must frequently eat nectar and bugs to maintain a high metabolism
- Hummingbird nests are very thermally sensitive and require the mother to frequently tend her nest to keep the eggs warm
- Monitoring behavior at nests analyzed using motion activated IP camera recordings of nests located at study sites throughout the Loyola Marymount University (LMU) campus
- Analysis of collected thermal images, will develop the understanding of the time female hummingbirds spend away from the nest versus the time spent incubating and brooding the offspring

- **Objective**
- To investigate attentiveness patterns throughout the January-March 2018 period for a nesting hummingbird, and compare attentiveness frequency between the incubation period of eggs and brooding stage of nestlings
- **Question**
  - Will the female hummingbird tend the nest more frequently during the presence of eggs or chicks?
- **Hypothesis**
  - Attentiveness will be higher while eggs are present, but less when chicks are present

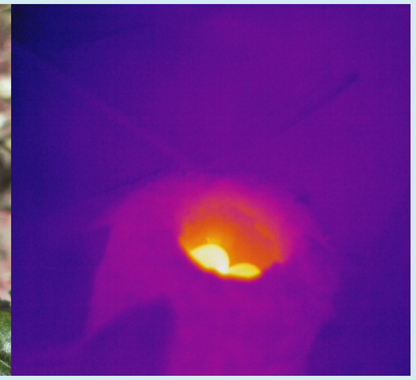
## Methods

- **Funding**
  - Experiment.com Crowdfunding
- **Data Collection**
  - Nest searching on LMU campus
    - January 2018 – March 2018
  - Remote Thermal Imaging
    - FLIR Vue Pro R
- **Data Analysis**
  - Time lapses were created where a photo was captured every minute
  - Range of time for annotated days were from 5:00 – 20:00 (24-hour clock), from the first leave of the day, to the last return
  - Determined proportions and averages of time on/off nest over total time annotated for each day



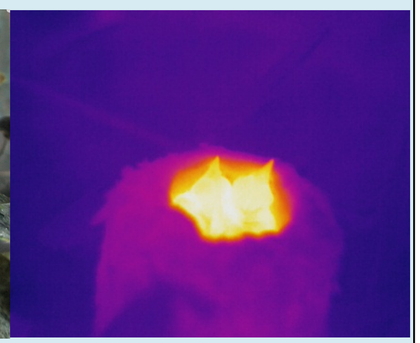

## Data

Nest 3: Color photo of the absent female hummingbird during incubation period **(Figure 1)**



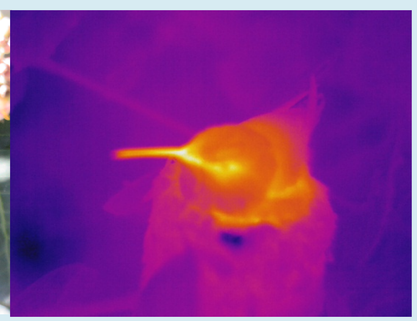
Nest 3: Thermal photo of the absent female hummingbird during incubation period **(Figure 2)**

Nest 3: Color photo of the nestlings without the female hummingbird at nest **(Figure 3)**



Nest 3: Thermal photo of nestlings while mother is away from the nest **(Figure 4)**

Nest 3: Color photo of the female hummingbird incubating the eggs **(Figure 5)**



Nest 3: Thermal photo of the female hummingbird incubating the eggs **(Figure 6)**

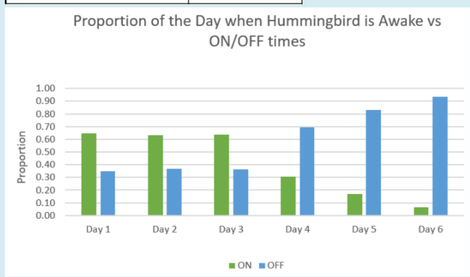
## Results

Data Summary: decimal numbers on the last two rows represent the proportion to the number of times the hummingbird was on/off the nest vs the total time awake **(Table 1)**

| DATA Summary | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 |
|---|---|---|---|---|---|---|
| Egg status | Eggs | Eggs | Eggs | Chicks | Chicks | Chicks |
| ON | 440 | 427 | 428 | 214 | 120 | 46 |
| OFF | 238 | 250 | 244 | 483 | 582 | 664 |
| TOTAL | 678 | 677 | 672 | 697 | 702 | 710 |
| ON | 0.65 | 0.63 | 0.64 | 0.31 | 0.17 | 0.06 |
| OFF | 0.351032448 | 0.369276 | 0.36309524 | 0.6929699 | 0.829059829 | 0.935211 |

| ON DATA SUMMARY | Average |
|---|---|
| EGGS | 0.64 |
| CHICKS | 0.18 |
| OFF DATA SUMMARY | Average |
| EGGS | 0.361134635 |
| CHICKS | 0.819080323 |

Averages of the three proportions for the attentiveness of the female hummingbird in the presence eggs/chicks **(Table 2)**




Female hummingbird is at nest for about the same amount of time during the three days analyzed during incubation. Days 1-3 are incubation periods, and days 4-6 are brooding periods. **(Figure 8)**

## Discussion

- Hypothesis was correct: Female hummingbird tended the nest more often in the presence of eggs than the presence of chicks
- Hummingbird was not at nest as often as a result to chicks being endothermic
- Only time mother needed to come back to nest was to feed and keep chicks warm during the night
- Mother might have been spending most of the time off nest to collect more food for herself, in addition to the two chicks
- Nestlings had filled the nest, and "data on attentive and inattentive periods at this time are lacking." (Howell and Dawson, 1954)
- **Future Research**
  - Include the variable of weather condition that could effect attentiveness
  - "Hummingbirds nesting in different environments must make corresponding adjustments in incubation behavior" (Vleck and Oecologia, 1981)

## Literature Cited

Howell, T., & Dawson, W. (1954). Nest Temperatures and Attentiveness in the Anna Hummingbird. *The Condor, 56*(2), 93-97. doi:10.2307/1364665
Vleck, C.M. Oecologia (1981) 51: 199. https://doi.org/10.1007/BF00540601

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