

Open positions for undergraduate and graduate research assistants

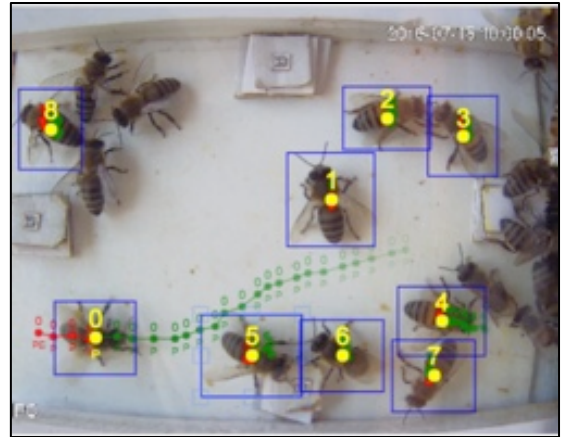
(Financial support available: Spring, Summer, Fall 2018)

Project: BigData approach for the analysis of honeybee behavior

<https://bigdbee.hpcf.upr.edu/>

Context:

Honey Bees exhibit highly complex behavior and are vital for our agriculture. Due to the rich social organization of bees, the overall performance and health of a bee colony depends both on a successful division of labor among the bees and on adequate reaction to the environment, which involves complex behavioral patterns and biological mechanisms. Much remains to be discovered on these matters as research is currently limited by our ability to effectively collect and analyze individual's behavior at large scale. The technology developed in this project will enable us to **study the individual behavior of thousands of bees over extended periods of time by using video and sensors** to track them in front of their colony.



Example of honeybees video captured 24/7 by the camera in front of the colony

Opportunities for research assistants:

The project provides opportunities to work on various topics, according to the skills and motivation of the students interested:

- **Computer vision:** automatic analysis of video data (bee tracking, activity recognition...)
- **Webapp development:** app to crowd-source data analysis, client and server side components
- **Scientific visualization:** display of bees' activities, interactive exploration of data
- **High Performance Computing:** deployment of computations on GPU node equipped with state-of-the-art NVIDIA Tesla cards and on linux clusters...
- **Data Mining:** explore and identify patterns in the long-term behavior of the bees

Send us an email, join the team !

Contacts:

PI: Rémi Mégret remi.megret@upr.edu

Computer Science Department, University of Puerto Rico, Río Piedras campus

Web: <http://ccom.uprrp.edu/~rmegret>

Co-PI: Edgar Acuña edgar.acuna@upr.edu

Mathematical Sciences Department, University of Puerto Rico, Mayagüez campus

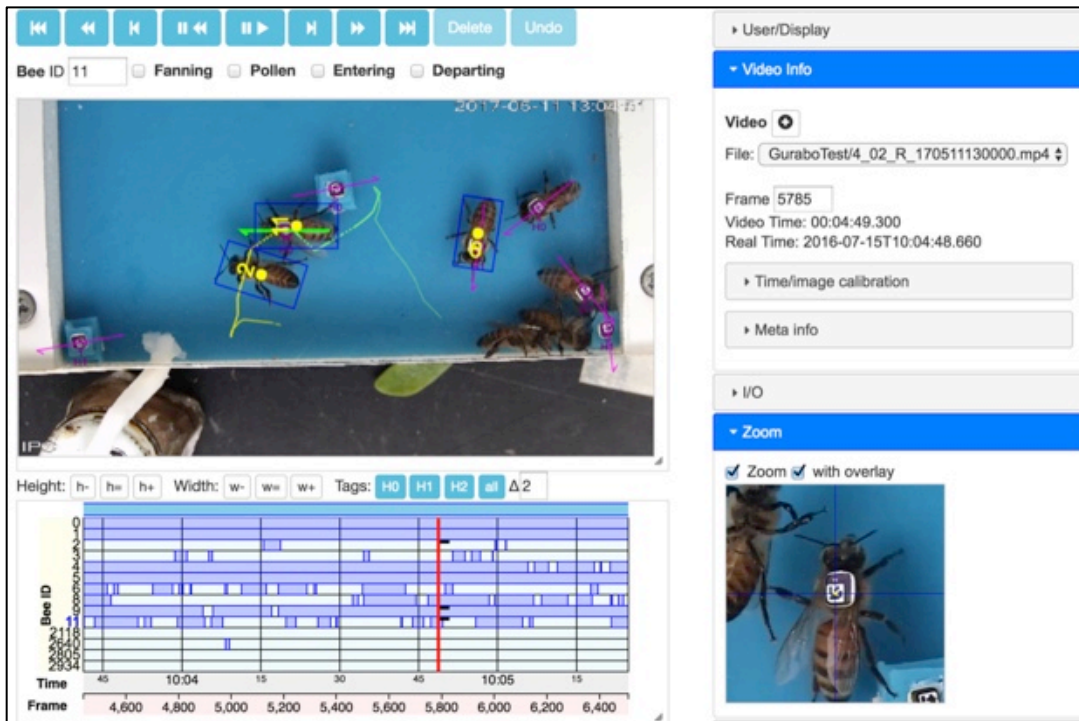


This project is supported by the
National Science Foundation
under Grant No. 1707355

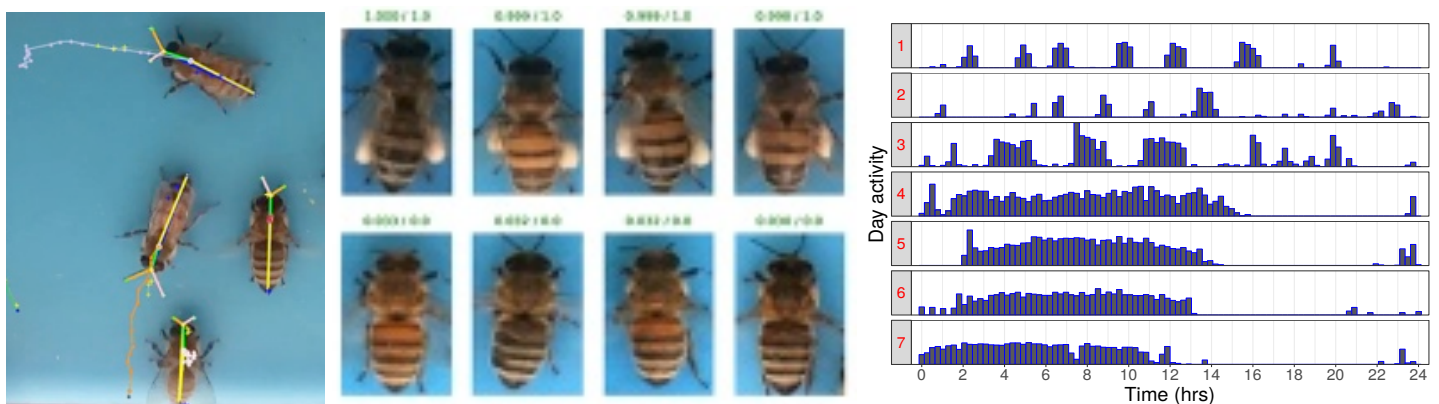
Some results so far:



Large-scale recording of bee activities 24/7 using cameras and sensors



Automatic detection of tagged bees and crowd-sourcing of the annotation of behavior using Flask+JS WebApp hosted at the UPR High-Performance Computing facility accessing several months of videos (1.2TB of data).



(left) Automatization of the tracking and (middle) recognition of pollen bearing bees using Machine Learning and Deep Neural Networks. (right) Actogram used to detect patterns of behavior.