RITIKA SIBAL

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EDUCATION

Boston University, Boston, Massachusetts **Aug 2023 – May 2025**
Master of Science in Biology, Ecology Evolution & Behavior ***3.96/4.0***
Awards: Master's Merit Scholarship, Denton Award for Best Thesis

University of Michigan, Ann Arbor, Michigan **April 2020**
Bachelor of Science in Engineering, Computer Engineering ***3.5/4.0***
Awards: Dean's List (2016-2020)

RESEARCH EXPERIENCE

Primate Ecology and Conservation Lab Boston, MA
Graduate Research Student, Dr. Cheryl Knott **Aug 2023 – Present**

- Developed a novel computer vision model (2% relative error) for pose estimation of wild orangutans, enabling non-invasive behavioral state analysis *(30-year dataset, 300+ videos)* **(manuscript submitted)**.
  - Trained a support vector machine (99% accuracy) to automatically classify body postures (e.g., sitting, standing) from joint position data.
  - Automated MATLAB pipelines to extract kinematic and time-series behavioral data from joint predictions, enabling locomotion modeling across individuals and species.
  - Analyzed terrestrial gait, downclimbing, and bipedal behavior in wild orangutans and chimpanzees, producing the first quantitative description of wild orangutan terrestrial gait **(manuscripts in prep)**.
- Applied statistical modeling (GAMs, GLMMs, and Bayesian regression) to focal sampling data to evaluate age-related trends in behavior diversity during development (**manuscript in prep).**
- Developing a thermal imaging-based pose estimation tool to enhance orangutan locomotion tracking.
- Creating a facial recognition application for wild orangutan identification *(collaboration with Visual Geometry Group, University of Oxford)*

Barton Research Group Ann Arbor, MI
Research Assistant, Dr. Alex Shorter, and Dr. Kira Barton **Sept 2016 – Jun 2020**

- Developed a hybrid neural network (LSTM-HMM) with 97% accuracy to enable dolphin swimming behavior classification based on motion data **(manuscript published).**
- Trained a computer vision model as a complementary multimodal approach for dolphin behavior classification.

Deep Robot Optical Perception Lab Ann Arbor, MI
Research Assistant, Dr. Matthew Johnson-Roberson **May 2018 – Jun 2020**

- Designed and constructed a 3D-printed autonomous surface vehicle for low-cost ecological data collection.

WORK EXPERIENCE

Apple Cupertino, CA
Firmware Automation Engineer **Aug 2020 – May 2022**

- Head engineer on 2021 MacBook release: discussed feature development and drove organization-wide meetings.
- Created robust automation frameworks in Python and embedded C to streamline firmware testing and improve software reliability.

Atmosic Technologies Boston, MA
Embedded Software Engineer **May 2022 – Jul 2023**

- Developed driver for radio (802.14.5) communication on a custom chip, enabling low-power IoT applications.
- Coded internal debugging tools to aid in application development and delivery.

PERSONAL PROJECTS

Autonomous Battery Charging for Wildlife Drones **Aug 2019 – Apr 2020**

- Designed and built a drone capable of autonomous wildlife surveys to and from a base charging station.
- Devised and implemented GPS waypoint following, obstacle avoidance algorithm, and a close proximity localization scheme to land the drone on a contact charging station precisely.

Adaptable Wheelchair for Animals **Apr 2022 – Oct 2022**

- Modeled (CAD) and built a custom 3D-printed wheelchair for a goat lacking front-leg mobility.

PUBLICATIONS

Sibal, Ritika, Liew, Evelyn, Betke, Margrit Knott, Cheryl. "DeepHutan: A novel, robust computer vision model for wild Bornean orangutan (*Pongo pygmaeus wurmbii*) pose estimation.". Manuscript in submitted. July 2025

Sibal, Ritika, Kane, Erin, Knott, Cheryl. "The Ontogeny of Positional Behavior in Wild Bornean Orangutans (*Pongo pygmaeus wurmbii*". Manuscript in preparation. Aug 2025

Sibal, Ritika, Zhang, Ding, Shorter, Alex, Barton, Kira. "Bidirectional LSTM Recurrent Neural Network Plus Hidden Markov Model For Wearable Sensor Based Dynamic State Estimation", Dynamic Systems and Control Journal. May 2019

Sammons, Patrick, Bollieni, Sahit, **Sibal, Ritika,** and Barton, Kira. "Temperature and Humidity Variation Effect on Process Behavior in Electrohydrodynamic Jet Printing of a Class of Optical Adhesives", *Solid Free Form Journal.* August 2017

PRESENTATIONS

Poster Presentations

- *A computer vision approach to comparing terrestrial gait in wild Bornean orangutans (Pongo pygmaeus wurmbii) and chimpanzees (Pan troglodytes)*
  American Association for the Advancement of Science, Hynes Convention Center, Boston, Feb 2025

Oral Presentations

- *Investigating locomotion in wild Bornean orangutans using computer vision and behavioral sampling*
  Master's Research Symposium, Boston University, Boston, May 2025
- *A computer vision approach to comparing terrestrial gait in wild Bornean orangutans (Pongo pygmaeus wurmbii) and chimpanzees (Pan troglodytes)*
  94th Annual Meeting of the American Association of Biological Anthropologists, Baltimore Marriott Waterfront, Baltimore, Mar 2025
- *Using computer vision to analyze the ontogeny of locomotion*
  Student Conference on Conservation Sciences, American Museum of Natural History, New York City, Oct 2024
- *Using computer vision to analyze the ontogeny of locomotion*
  Biology Graduate Research Symposium, Boston University, Boston, Mar 2024

SOFTWARE SKILLS

Platforms:	Windows, macOS, Linux
Programming Languages:	Python**,** R, MATLAB, C++, Arduino, Git
Statistical & Modeling Skills:	Generalized Additive Models (GAMs), Bayesian statistics, Generalized Linear Mixed Models (GLMMs), Species Distribution Modeling, Machine Learning (ML), Passive Acoustic Monitoring
Protocols:	GPS, Bluetooth, RFID, I2C/SPI/UART (embedded protocols), Amazon Web Services
Scientific Communication:	Digital Illustration (Procreate), Adobe Photoshop, Adobe Animation, Video Editing (Final Cut Pro)
Additional Technical Skills:	Real-time operating systems (RTOS), CAD (Autodesk Fusion 360 and 3Ds Max)

LANGUAGES

English (Fluent), Bahasa Indonesia (Proficient), Hindi (Proficient)