ALEXANDRA BACULA

CONTACT

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EDUCATION

Oregon State University
- Ph.D., Robotics
  THESIS: *Socially Communicative Multi-Robot Motion and Formation: Algorithm Development and Validation*
  ADVISOR: Prof. Heather Knight

June, 2023
GPA: 3.81

University of Illinois at Urbana-Champaign
- B.S., Aerospace Engineering with Honors
  THESIS: *Movement Analysis of Characters in Classical Ballet*
  ADVISOR: Dr. Amy LaViers

May, 2018
GPA: 3.68

APPOINTMENTS

OTTO Motors
- User Design Co-Op
  o Researching conversational user interfaces for factory robots

Jan 2024 – Sept 2024

The Robotics, Automation, and Dance Lab
- Research Scientist
  o Developing web interface for annotating human motion
  o Running conference workshops on movement notation

June 2023 – June 2024

Oregon State University
- Research Assistant
  o Human-robot interaction, expressive motion, multi-robot systems
- Teaching Assistant
  o CS 391: Social and Ethical Issues in Computing
  o CS 464: Open Source Software
  o ME 431/ECE 451: System Dynamics and Controls
  o ENGR+102: Design Engineering and Problem Solving
  o ENGR+103: Coding for Visual, Interactive, and Generative Art

Sept 2018 - June 2023

Clearpath Robotics
- Intern with Autonomy Group
  o Human-robot interaction, user-informed design, user study evaluations, legible lights for minimal mobile factory robots

June 2019 – Sept 2019

Jet Propulsion Laboratory
- Intern with Group 347E: Robotics Estimation, Decision and Control
  o Fast motion planning, algorithm testing and evaluation, ROS simulation

May 2016 – Aug 2016

JOURNAL PAPERS

Bacula, Alexandra, Jason Mercer, Jaden Berger, Julie A. Adams, Heather Knight. "Integrating Robot Manufacturer Perspectives into Legible Factory Robot Light Communications," *Transactions on Human-Robot Interaction* 12 (1), pp. 1-33. February, 2023.

Bacula, Alexandra, Heather Knight. "MoTiS Parameters for Expressive Multi-Robot Systems: Relative Motion, Timing, and Spacing." *International Journal of Social Robotics* 14 (9), pp. 1965-1993. November, 2022.

Bacula, Alexandra, Amy LaViers. "Character Synthesis of Ballet Archetypes on Robots Using Laban Movement Analysis: Comparison Between a Humanoid and an Aerial Robot Platform with Lay and Expert Observation." *International Journal of Social Robotics* 13, pp. 1047-1062. 2020.

CONFERENCE PAPERS

Bacula, Alexandra, and Heather Knight. "Dancing with Robots at a Science Museum: Coherent Motions Got More People To Dance, Incoherent Sends Weaker Signal." *Proceedings of the 2024 International Symposium on Technological Advances in Human-Robot Interaction.* March, 2024*.

Bacula, Alexandra, Deanna Flynn, Ethan Villalovoz, Ankur Mehta, and Heather Knight. " Social Triangles and Aggressive Lines: Multi-Robot Formations Impact Navigation and Approach." *Proceedings of the International Conference of Intelligent Robots and Systems*, October, 2023.

Bacula, Alexandra, Heather Knight. "Incoherent Robot Groups: How Divergent Motions within a Robot Group Predict Functional and Social Interpretations." *Proceedings of the 8th International Conference on Movement and Computing*, pp. 1-6. June, 2022.

Berger, Jaden, Alexandra Bacula, Heather Knight. "Exploring Communicatory Gestures for Simple Multi-Robot Systems," *Proceedings of the 13th International Conference on Social Robotics*, Singapore, November, 2021.

Bacula, Alexandra, Amy LaViers, "Character Design and Validation on Aerial Robotic Platforms Using Laban Movement Analysis," *Proceedings of the 10th International Conference on Social Robotics*, Qingdao, China, 2018.

Bacula, Alexandra, Amy LaViers, "Character Recognition on a Humanoid Robotic Platform via a Laban Movement Analysis," *Proceedings of the 5th International Conference on Movement and Computing*, Genoa, Italy, June, 2018.

Baldini, Francesca, Saptarshi Bandyopadhyay, Rebecca Foust, Soon-Jo Chung, Amir Rahmani, Jean-Pierre de la Croix, Alexandra Bacula, Christian M. Chilan and Fred Hadaegh. "Fast Motion Planning for Agile Space Systems with Multiple Obstacles." *AIAA/AAS Astrodynamics Specialist Conference*. 2016.

WORKSHOP PAPERS

Bacula, Alexandra, Jason Mercer, and Heather Knight. "Legible Light Communications for Factory Robots." *In Companion of the 2020 ACM/IEEE International Conference on Human-Robot Interaction*, pp. 119-121. 2020.

Bacula, Alexandra, Heather Knight. "Dance Prototyping: Communicating Group Membership and Relational Attitudes via Multi-Robot Expressive Motion." *In Companion of the 2020 Robotics Science and Systems Conference*. July, 2020.

Bacula, Alexandra, Heather Knight. "Excluded by the JellyFish: Robot-Group Expressive Motion." *ICRA-X Robotics and Art*. Montreal, Canada. roboticart.org. 2019.

WORKSHOPS	**International Conference on Robotics and Automation**	May 2024

- Speed Dating to Long-Term Relationships: Art-Robot residencies enabled by common language
  This workshop introduced participants the ways in which art and robotics practices can inform one another, facilitating communication between artists and roboticists with the aim of long-term collaboration

International Conference on Human-Robot Interaction   March 2024

- Tutorial on Movement Notation: An Interdisciplinary Methodology for HRI to Reveal the Bodily Expression of Human Counterparts via Collecting Annotations from Dancers in a Shared Data Repository
  This workshop introduced participants to different forms of movement notation, focusing on the BESST system, based on Laban Movement Analysis

SoCal Robotics Symposium   Sept 2022

- Interactive Robot Aquarium: A Deeper Dive
  This workshop introduced participants to the code behind the robots in the Interactive Robot Aquarium Demo, teaching them how to create their own expressive motions on the sea creature robots

PERFORMANCES AND DEMOS

Oregon Museum of Science and Industry   Sept 2022 – Jan 2023

- Demo: Superheroes vs Supervillains Dance Party
  This demo focused on multi-part interactions with people, exploring how different aspects of my MoTiS system could be used to facilitate various types of complex interactions.

- Demo: Haunted House Cats
  The goal of this demo was to see how museum patrons responded when robots moved in their space in a crowd. The robots moved both together and separately through large crowds of people and observed how people reacted and sometimes interacted with the robots.

- Demo: Expressive Extraterrestrials
  This demo focused on how people perceived robots moving at different speeds and directions. After watching the robots emerge from their UFO, patrons were asked what they thought the robots were trying to communicate, and what about their motion lead them to that conclusion.

SoCal Robotics Symposium   Sept 2022

- Demo: Interactive Robot Aquarium
  In collaboration with Prof. Ankur Mehta (UCLA), we presented jellyfish robots and mobile turtle robots to create an interactive sea creature experience

Soundbox 4   May 2020

- Performance: Four Spheros in Quarantine

This performance explored how robot performances could create a sense of shared experience with human performers by performing remotely in a home setting

Soundbox 3
May 2019

- Performance: Baba Yaga's Bot
  This project looked to reimagine the story of Baba Yaga through modern technology, using Mussorgsky's Hut on Fowl's Legs and the folktales of Baba Yaga as inspiration in collaboration with fine arts and music composition students.

SinguHilarity
April 2019

- Performance: Mechahydrozoa Umbrellianus
  This piece explored how inclusion and exclusion can be expressed through motion in human-robot groups and was in collaboration with Prof. Dana Reason and the Majestic Theater to create an immersive performance experience