

# Fanjun Bu

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## EDUCATION

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### Johns Hopkins University, 3.98/4.00

Aug. 2017 – May 2021

*Bachelor of Science in Applied Mathematics & Statistics*

*Baltimore, MD*

- Second Major in Computer Science and Cognitive Science
- Awards: Applied Mathematics & Statistics Achievement Award (Naddor Prize); CRA Outstanding Undergraduate Researchers Honorable Mentions.

### Johns Hopkins University

Aug. 2020 – May 2021

*Master of Science in Engineering (CS)*

*Baltimore, MD*

## RESEARCH EXPERIENCE

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### Personal Robotics Lab

May 2020 – Present

*University of Washington (online)*

*Seattle, WA*

- Worked on the *Food Manipulation for Assisted Feeding* project under the supervision of Tapomayukh Bhattacharjee and Prof. Siddhartha Srinivasa
- Surveyed robot's impact in social settings across fields of sociology, psychology, and computer science
- Investigated the timing of robotics assistive feeding in a social setup and used TCN to predict appropriate feeding time window with minimum interruption to ongoing social dynamics at the dinner table

### Intuitive Computer Lab

Jan. 2020 – Present

*Johns Hopkins University*

*Baltimore, MD*

- Undergraduate research assistant under the supervision of Dr. Chien-Ming Huang
- *Independent Research Topic*: As robots perform manipulation tasks and interact with objects, it is probable that they accidentally drop objects (e.g., inadequate grasp of an unfamiliar object) that subsequently bounce out of their visual fields. To enable robots to recover from such errors, we draw on the concept of *object permanence*—objects remain existed even when they are not being sensed (e.g., seen) directly. In particular, we developed a multimodal neural network model—combining a partially observed trajectory and audio resulted from the drop impact—to predict the full bounce trajectory and the end location of a dropped object.

### Honey Lab

Nov. 2017 – Present

*Johns Hopkins University*

*Baltimore, MD*

- Lab research assistant under the supervision of Shima Rahimi Moghaddam and Prof. Christopher Honey
- Designed and conducted cognitive experiments on Amazon MTurk for over 60 subjects to study the implicit learning of dynamic visual sequences
- *Research Topic*: In real world, humans often learn from temporally smooth data, that is, the samples are correlated across nearby points in time. In this project, we first investigated the effects of smoothness in training data on incremental learning in feedforward nets. Then, we demonstrated that two simple brain-inspired mechanisms—leaky memory in activation units and memory-gating—can enable networks to exploit the redundancies in smooth data. Finally, we showed how these brain-inspired mechanisms altered the internal representations learned by the networks.

### Learning Algorithms and Systems Laboratory (LASA)

June 2019 – August 2019

*The École Polytechnique Fédérale de Lausanne*

*Lausanne, Switzerland*

- Lab assistant under the supervision of Konstantinos Chatzilygeroudis and Prof. Aude Billard
- Worked on the benchmark project *Skill Acquisition in Humans and Robots (SAHR)* to develop a substitution algorithm for motion capture system using computer vision and ChArUco markers

## WORK EXPERIENCE

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### Summer Intern

June 2018 – August 2018

*Nokia Mobile Network R&D*

*Qingdao, China*

- Developed a Continuous Integration system tool on top of GIT and Jenkins for Nokia Mobile Network product
- Wrote programs on core dump detection and system provisioning verification

### Undergraduate Teaching Assistant

Aug. 2019 – Present

*Whiting School of Engineering, JHU*

*Baltimore, MD*

- Teaching Assistant for 553.430 Introduction to Statistics in the Applied Math & Statistics Department; taught weekly section and held office hours (Fall 2019, Spring 2020)
- Course Assistant for 601.457 Computer Graphics (Fall 2020); held weekly office hours

### Volunteer

Oct. 2017 – May 2018

*Keswick Multi-Care Center*

*Baltimore, MD*

- Led weekly sessions to teach residents how to use computers (Internet) and smart devices

## PUBLICATIONS AND MAJOR WORK

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Chatzilygeroudis, K., Fichera, B., Lauzana, I., **Bu, F.**, Yao, K., Khadivar, F., & Billard, A. (2020). Benchmark for Bimanual Robotic Manipulation of Semi-Deformable Objects. *IEEE Robotics and Automation Letters*, 5(2), 2443-2450.  
*Developed a substitution algorithm for motion capture system using computer vision and ChArUco markers.*

Paper in submission (IROS): **Fanjun Bu** and Chien-Ming Huang. Object Permanence Through Audio-Visual Representations. 2020.arXiv:2010.09948 [cs.RO].

*I worked on this project independently. Collected dataset is available at <https://doi.org/10.7281/T1/EP0W7Y>.*

Paper in submission: Shima Rahimi Moghaddam, **Fanjun Bu**, and Christopher J. Honey. Learning Representations from Temporally Smooth Data. 2020. arXiv:2012.06694 [cs.LG].

*Wrote python scripts to test the effect of temporally smooth data using MNIST & Fashion-MNIST dataset, implemented bio-inspired mechanisms using PyTorch and ran associated tests, and analyzed result.*

## SKILLS

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**Language:** Mandarin (Native), French (Elementary proficiency)

**Programming Languages:** Java, Python, C/C++, SQL, JavaScript, HTML/CSS, Matlab

**Libraries:** Pandas, NumPy, Matplotlib, PyTorch, ROS, OpenCV

**Platforms:** Git, Amazon MTurk

**Other:** Piano, Violin (beginner)