

# Sarah Brogden Payne

DEPARTMENTS OF LINGUISTICS AND COMPUTER & INFORMATION SCIENCE

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## Education

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### University of Pennsylvania

Philadelphia, PA

B.A, HONORS, LINGUISTICS & COMPUTER AND INFORMATION SCIENCE

May 2022 (expected)

- Minor: Cognitive Science
- Thesis Advisor: Dr. Charles Yang
- GPA: 3.91/4.0

### Indiana University Bloomington

Bloomington, IN

DUAL ENROLLMENT, MATH & COMPUTATIONAL LINGUISTICS

2017-18

- Enrolled in Calculus III & IV (M311 & M312); Programming for Computational Linguistics (L435); The Computer and Natural Language (L445) during final year of high school
- GPA: 4.0/4.0

## Research Interests

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**Language Acquisition:** phonetic, phonological and morphological acquisition; language in the mind & brain; bilingual acquisition; syntax-semantics interface in acquisition; sparsity of the input; experimental methods; learnability

**Computational Linguistics:** algorithmic models of acquisition; word learning; computational approaches to phonetics, phonology, and morphology

**Natural Language Processing:** robustness; bias, bias mitigation, and bias analysis in large-scale models

## Publications

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### PEER-REVIEWED CONFERENCE PROCEEDINGS

{Caleb Belth, **Sarah Payne**}, Jordan Kodner, & Charles Yang (to appear). *Searching for Morphological Productivity*. Proceedings of the 46th annual Boston University Conference on Language Development.

Caleb Belth, **Sarah Payne**, Deniz Beser, Jordan Kodner, & Charles Yang (2021). *The Greedy and Recursive Search for Morphological Productivity*. Proceedings of the 43rd Annual Meeting of the Cognitive Science Society. 42(1):2869-2875.

Deniz Beser, Joe Cecil, Marjorie Freedman, Jacob Lichtefeld, Mitch Marcus, **Sarah Payne**, & Charles Yang (2021). *A Grounded Approach to Modeling Generic Knowledge Acquisition*. Proceedings of the 43rd Annual Meeting of the Cognitive Science Society. 42(1):2450-2456.

**Sarah Payne**, Jordan Kodner, & Charles Yang (2021). *Learning Morphological Productivity as Meaning-Form Mappings*. Proceedings of the Annual Meeting of the Society for Computation in Linguistics. 4(1):177-187.

### MANUSCRIPTS

Ryan Gabbard, Deniz Beser, Jacob Lichtefeld, Joe Cecil, Mitch Marcus, **Sarah Payne**, Charles Yang, & Marjorie Freedman (2021). *ADAM: A Sandbox for Implementing Language Learning*. ArXiv, abs/2105.02263.

## Presentations

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**Sarah Payne**, Caleb Belth, Jordan Kodner, & Charles Yang (2022). *Searching for Morphological Productivity*. Talk given at the 96th Meeting of the Linguistics Society of America.

**Sarah Payne**, Caleb Belth, Jordan Kodner, & Charles Yang (2021). *The Recursive Search for Morphological Productivity*. Poster presented at the 5th Annual American International Morphological Meeting.

**Sarah Payne**, Peng Qian, Ethan Wilcox, & Roger Levy (2021). *Particle Filtering with Neural Language Models: Modelling the Effects of Memory on Incremental Sentence Processing*. Poster presented at the MIT Center for Brains, Minds and Machines Summer Research Poster Session.

Ryan Gabbard, Jacob Lichtefeld, Deniz Beser, Joe Cecil, Mitch Marcus, **Sarah Payne**, Charles Yang, & Marjorie Freedman (2021). *Grounding Word Learning Across Situations*. Poster presented at the 43rd Annual Meeting of the Cognitive Science Society.

**Sarah Payne** (2019). *Categorization of Novel Referents by a Seeing Eye Dog*. Talk given at the University of California Berkeley Undergraduate Linguistics Symposium.

**Sarah Payne** & Chris Callison-Burch (2019). *From Word Meaning to Phrase Meaning: Compositionality*. Poster presented at the University of Pennsylvania Center for Undergraduate Research Poster Session.

## Research Experience

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### **Center for Brains, Minds, and Machines Summer Research Fellow, MIT**

Cambridge, MA

ADVISOR: DR. ROGER LEVY

2021

- Worked in the Computational Psycholinguistics Lab to model working memory limitations on incremental processing of garden path sentences
- Implemented particle filtering with neural language models and compared surprisal results to human reading times

### **Research Assistant Intern, Information Sciences Institute (ISI)**

Waltham, MA

ADVISORS: DR. RYAN GABBARD & DR. MARJORIE FREEDMAN

2020

- Collaborated with researchers at ISI and Penn on the ADAM project under DARPA's Grounded Artificial Intelligence Language Acquisition Program to create a cognitively-plausible learner that learns from concrete situations and syntactic bootstrapping
- Implemented the system in Mandarin Chinese by eliciting native speaker judgments and writing a Chinese language generator

### **Research Assistant, Bottleneck-Feature Extraction for Phone Embeddings**

College Park, MD

ADVISOR: DR. DAN SWINGLEY, DR. THOMAS SCHATZ, & DR. NAOMI FELDMAN

2020

- Funded by MindCORE to travel to the University of Maryland during January 2020
- Used bottleneck features in Kaldi to develop phone embeddings that can be tested against human judgement

### **Research Assistant, Infant Language Center**

Philadelphia, PA

ADVISOR: DR. DAN SWINGLEY

2019-20

- Created phoneme embeddings based on Bottleneck Features that are optimized to mimic the perception of an infant
- These embeddings will be helpful for computationally modelling of phenomena such as categorical perception

### **Penn Undergraduate Research Mentoring Program (PURM)**

Philadelphia, PA

ADVISOR: DR. CHRIS CALLISON-BURCH

2019

- Generated phrase embeddings from word embeddings, incorporating visual and syntactic information to create a model that beats previous baselines by approximately 20%.

### **Research Assistant, Multimodal Embeddings**

Philadelphia, PA

ADVISOR: DR. CHRIS CALLISON-BURCH

2018-19

- Collaborated with students at Penn and Swarthmore to create multi-modal embeddings by imagining mappings from words to images
- Produced embeddings that provide a baseline for future experiments and can be utilized in various NLP tasks.

## Teaching Experience

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Fall 2021 **CIS 380: Operating Systems**, Teaching Assistant, *University of Pennsylvania*

Spring 2021 **CIS 240: Intro to Computer Architecture**, Teaching Assistant, *University of Pennsylvania*

Fall 2020 **NETS 212: Scalable and Cloud Computing**, Teaching Assistant, *University of Pennsylvania*

Spring 2019 **CIS 192: Intro to Python**, Teaching Assistant, *University of Pennsylvania*

## Other Work Experience

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### Teaching Assistant (TA) Trainer

UNIVERSITY OF PENNSYLVANIA SCHOOL OF ENGINEERING

Philadelphia, PA  
Jan. 2021- Present

- Work with other experienced teaching assistants to lead training sessions for incoming TAs

### Peer Writing Tutor

UNIVERSITY OF PENNSYLVANIA MARKS FAMILY WRITING CENTER

Philadelphia, PA  
2019-20

- Helped students at Penn grow as writers by holding weekly appointments and offering drop-in assistance

### Cloud Technology Support Intern

INDIANA UNIVERSITY INFORMATION TECHNOLOGY SERVICES

Bloomington, IN  
2017-18

- Planned and helped execute the rollout of Adobe Sign for secure, campus-wide E-signature services
- Created training materials and trained users on AWS, Box, and Adobe products to help improve user experience

## Awards

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Spring 2021 **Elected to Phi Beta Kappa**, University of Pennsylvania

2018-19 **Dean's List**, University of Pennsylvania (*Subsequently discontinued due to COVID-19*)

## Service and Outreach

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### Elected Member, University Council

UNIVERSITY OF PENNSYLVANIA

Philadelphia, PA  
2021-22

- Elected to represent the concerns and voices of the anti-violence community and survivors to university administrators

### Chair, Abuse and Sexual Assault Prevention (ASAP)

UNIVERSITY OF PENNSYLVANIA

Philadelphia, PA  
2021-Present

- Incorporate education, activism, and outreach to spread ASAP's message to a wider audience
- Lead board and general meetings and collaborations; co-host Take Back the Night with other universities in Philadelphia

### Board Member, Abuse and Sexual Assault Prevention (ASAP)

UNIVERSITY OF PENNSYLVANIA

Philadelphia, PA  
2019-2020

- Facilitated communication and collaboration among several of Penn's anti-violence groups
- Helped facilitate discussions on Transformative Justice, domestic violence during Covid-19, and other topics

### Liason, Coalition Against Fraternity Sexual Assault (CAFSA)

UNIVERSITY OF PENNSYLVANIA

Philadelphia, PA  
2019

- Participated in discussions with Penn administration about improvements to the Title IX reporting process
- Advocated for the incorporation of anonymous reporting as is now required by the state of Pennsylvania and the removal of Greek life from Penn's Campus

## Other

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### LANGUAGES

**Native:** British and American English

**Intermediate:** Spanish, Latin

### TECHNICAL SKILLS

**Proficient:** Python, C, C++, Git, Bash, Linux

**Intermediate:** Java, R, LaTeX, Amazon Web Services

**Beginner:** JavaScript, HTML/CSS