

Madeleine Grunde-McLaughlin

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<https://madeleinegrunde.github.io/>

EDUCATION

UNIVERSITY OF WASHINGTON

PhD Student in Paul G. Allen School of Computer Science and Engineering
Advisors: Jeffrey Heer and Daniel Weld

Seattle, WA

September 2021 - Present

UNIVERSITY OF PENNSYLVANIA

Bachelor of Arts in Cognitive Science
Minors: Computer Science, French

Philadelphia, PA

August 2016 - May 2021

PRINCETON UNIVERSITY

Audited Computer Vision, NLP, Advanced Graph Theory (not for credit)

Princeton, NJ

September - December 2019

LYON LUMIÈRE II

French courses including Neuroscience, Human Computer Interaction, and Memory

Lyon, France

January - May 2019

PUBLICATIONS

When Do XAI Methods Work? A Cost-Benefit Approach to Human-AI Collaboration

Helena Vasconcelos, Matthew Jörke, **Madeleine Grunde-McLaughlin**, Ranjay Krishna, Tobias Gerstenberg, Michael Bernstein
TRAIT Workshop at CHI Conference on Human Factors in Computing Systems

2022

AGQA-Decomp: Measuring Compositional Consistency for Video Question Answering

Mona Gandhi, Mustafa Öümer Gul, Eva Prakash, **Madeleine Grunde-McLaughlin**, Ranjay Krishna, Maneesh Agrawala
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition

2022

AGQA: A Benchmark for Compositional Spatio-Temporal Reasoning

Madeleine Grunde-McLaughlin, Ranjay Krishna, Maneesh Agrawala
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition 2021

2021

Bayesian-Assisted Inference from Visualized Data

Yea-Seul Kim, Paula Kayongo, **Madeleine Grunde-McLaughlin**, Jessica Hullman
IEEE Transactions on Visualization and Computer Graphics 2020

2020

PRESENTATIONS

AGQA: A Benchmark for Compositional Spatio-Temporal Reasoning

Madeleine Grunde-McLaughlin, Ranjay Krishna, Maneesh Agrawala
Poster Presentation: Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition

2021

Measuring Spatio-Temporal Reasoning Through VideoQA

Madeleine Grunde-McLaughlin, Ranjay Krishna, Maneesh Agrawala
Poster Presentation: Grace Hopper Celebration of Women in Computing

2020

SELECTED AWARDS AND HONORS

Allen School Computer Science & Engineering Research Fellowship

1-year fellowship from the University of Washington Allen School

2021

College Alumni Society Prize in Cognitive Science

Awarded to the best Cognitive Science thesis each year

2021

Phi Beta Kappa Honor Society

2021

RESEARCH EXPERIENCE

INFLUENCE FUNCTIONS FOR DATA ANALYSIS

University of Washington

Domain: Human Computer Interaction, Data Visualization

January 2022 – Present

Mentors: Professor Jeffrey Heer, Professor Daniel Weld

- Adjusting influence functions calculations on Computer Vision data to reflect updated parameters
- Developing interactive visualizations using influence functions for AI analysis
- Designing approaches for applying this data analysis to dataset cleaning and AI interpretability

QUESTION DECOMPOSITION

Stanford University

Domain: Vision and Language Learning

June 2021 – March 2022

Mentors: Professor Maneesh Agrawala, Dr. Ranjay Krishna

Publication: IEEE CVPR 2022

- Designed a method to represent questions as a DAG of sub-questions related through compositional reasoning
- Developed metrics measuring a model's logical consistency among related questions
- Mentored 3 undergraduate and masters students through the research process
- Evaluated the validity of generated questions through an human study on Amazon Mechanical Turk

COST-BENEFIT APPROACH TO HUMAN-AI INTERACTION

Stanford University

Domain: Human-Computer Interaction

April 2021 – April 2022

Mentors: Professor Michael Bernstein, Professor Tobias Gerstenberg, Dr. Ranjay Krishna

Publication: CHI TRAIT Workshop 2022

- Formulated hypotheses about the implications of the cost-benefit framework on AI overreliance
- Calculated the power analyses and other statistical tests about the experiment results
- Synthesized a literature review in the subjects of Explainable AI, Cognitive Science, and Behavioral Economics

ACTION GENOME QUESTION ANSWERING

Stanford University

Domain: Computer Vision

May 2020 – May 2020

Mentors: Professor Maneesh Agrawala, Dr. Ranjay Krishna

Publication: IEEE CVPR 2021

- Built a pipeline to generate over 192 million complex question answer pairs about videos
- Developed an algorithm to balance answer distributions, leaving a final dataset of 3.9 million question-answer pairs
- Established a suite of metrics to measure different compositional reasoning skills
- Applied successfully for AWS credits through the Stanford Institute for Human-Centered Artificial Intelligence

HIERARCHICAL REASONING IN WORKING MEMORY

University of Pennsylvania

Domain: Cognitive Science

January 2020 - May 2021

Mentors: Professor Alan Stocker, Dr. Cheng Qiu

- Created an interactive task to measure attraction and repulsion biases in spatial working memory
- Analyzed the results of the task to infer the most likely model of the structure of visual working memory
- Wrote a literature review about previous tactics used to predict the structure of working memory

BAYESIAN INTERVENTIONS

Northwestern University

Domain: Human Computer Interaction, Data Visualization

June - December 2019

Mentors: Professor Jessica Hullman, Professor Yea-Seul Kim

Publication: IEEE InfoVis 2020

- Formulated a design space for visualizations using belief elicitation and Bayesian modeling
- Constructed Bayesian statistical models of the cognitive effects of source trust
- Designed and implemented interactive Bayesian visualizations through D3 and Idyll
- Analyzed literature on source trust elicitation and risk analogies to inform project design decisions

THEY DRAW IT!

Northwestern University

Domain: Human Computer Interaction, Data Visualization

June - August 2019

Mentors: Professor Jessica Hullman, Francis Nguyen

- Implemented multiple style functionalities for tool helping journalists create interactive visuals
- Contributed to design decisions about improving interface useability
- Brainstormed questions to ask journalists about interactive visualizations and analyzed responses

WORK EXPERIENCE

ARAVIND EYE CARE SYSTEMS

Madurai, India

Project Student

May - August 2018

- Implemented a Moodle Learning Management System to track training completion for doctors and nurses
- Lead a focus group with 8 doctors to test the Learning Management System interface
- Liaised between 5 departments on designing the goals and implementation of this project

DYNAMIX GYMNASTICS

Levittown, Pennsylvania

Assistant Camp Director

June - August 2017

- Managed a team of 11 coaches of various experience levels
- Communicated goals to and mediated interpersonal conflicts among coaches, parents, and children

SERVICE AND LEADERSHIP

PENN FOR REFUGEE EMPOWERMENT

University of Pennsylvania

Leadership Positions: Vice President, Director of Tutoring

February 2017 - May 2021

- Co-founded tutoring program that now connects 50+ volunteers to tutor refugees in Philadelphia and abroad
- Re-structured the organization's focus to increase tutoring numbers by over 300% in one semester
- Participated in the UN TOGETHER Campaign to promote university student led refugee aid organizations
- Tutored high school students at the African Family and Health Organization (AFAHO) in West Philadelphia

ALPHA PHI OMEGA SERVICE FRATERNITY

University of Pennsylvania

Leadership Positions: Pledge Service Chair, Leadership Committee

January 2018 - May 2021

- Volunteer at various service events in Philadelphia, especially UCHC soup kitchens and Books Through Bars
- Lead a service committee that collaborated with an event cleaning streets in North Philadelphia

TECHNICAL SKILLS

Advanced - Python; Proficient - HTML/CSS, R, Pytorch, Tensorflow, Java; Basic - React, D3, Idyll