

# Yuen Chen

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## EDUCATION

University of Illinois at Urbana-Champaign

Expected May 2028

Ph.D. Student in Computer Science, advised by Prof. Hari Sundaram & Prof. Han Zhao

Research Topics: Causal Inference, Bayesian Inference, Domain Generalization

University of California Berkeley

Graduated December 2022

B.A. Applied Mathematics & Statistics

GPA: 3.93/4.00

University of Copenhagen

February 2022 - June 2022

Exchange Student in Computer Science and Mathematical Science

GPA: 10.5/12

Irvine Valley College

Graduated May 2020

Associate in Science in Mathematics

GPA: 3.94/4.0

## SKILLS

**[Theoretical Domains]** Causal Inference, Machine Learning, Natural Language Processing

**[Programming Languages]** Python, R/R Studio, MATLAB

**[Machine Learning Frameworks and Libraries]** PyTorch, TensorFlow, NumPy, Pandas, Pyro

## RESEARCH EXPERIENCE

Graduate Researcher | University of Illinois at Urbana-Champaign

August 2023 - Present

*Advisors: Prof. Hari Sundaram and Prof. Han Zhao*

- Conducting research on **domain generalization** to improve machine learning models' performance under distribution shifts
- Accelerated stochastic variational inference through efficient sampling and tuning the mini-batch size

Research Intern | Empirical Inference, Max Planck Institute for Intelligent Systems

February 2023 - July 2023

*Supervisors: Prof. Bernhard Schölkopf & Zhijing Jin (Ph.D. at Max Planck Institute & ETH)*

- Developed the "CLadder" benchmark to assess formal causal reasoning ability in Large Language Models (LLMs).
- Proposed a prompting-strategy to elicit multi-step formal causal reasoning in LLMs.
- Conducted experiments analyzing the impact of semantic representations on LLM performance

Undergraduate Researcher | Language, Reasoning and Education Lab, ETH Zürich

August 2023 - December 2022

*Supervisors: Prof. Mrinmaya Sachan & Zhijing Jin (Ph.D. at Max Planck Institute & ETH)*

- Conducted research on **experimental design** to optimize experimental tables with orthogonal arrays

Undergraduate Researcher | University of Copenhagen

February 2022 - June 2022

*Supervisor: Prof. Yevgeny Seldin*

- Conducted research to find an optimal algorithm for **multi-armed bandits** problems with time-based switching costs
- Reviewed literature in online learning, gaining insights into current methodologies and trends.

## PAPERS

**CLadder: Assessing Causal Reasoning in Language Models.**

Zhijing Jin\*, **Yuen Chen\***, Felix Leeb\*, Luigi Gresele\*, Ojasv Kamal, Zhiheng Lyu, Kevin Blin, Fernando Gonzalez, Max Kleiman-Weiner, Mrinmaya Sachan, Bernhard Schölkopf. *In Proceedings of the 37th Advances in Neural Information Processing Systems (NeurIPS 2023).*

**CausalCite: A Causal Formulation of Paper Citations.**

Ishan Kumar Agrawal\*, Zhijing Jin\*, Ehsan Mokhtarian, Siyuan Guo, **Yuen Chen**, Negar Kiyavash, Mrinmaya Sachan, Bernhard Schölkopf. *Under review for Proceedings of the 12th International Conference on Learning Representations (ICLR 2024).*

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\*Equal Contribution

## HIGHLIGHTED PROJECTS

### Time Series Analysis on Semiconductor Processing Tools

Fall 2022

- Developed a **machine learning model** to predict the performance of wafer production process
- Condensed 560k+ data into 216 data by Fast Fourier Transform, sinusoidal regression, and quadratic regression
- Achieved 87% prediction accuracy on wafer metrology with a linear regression model

### Offline Evaluation of Bandit Algorithms

Spring 2022

- Evaluated bandit algorithms with importance-weighted losses on “R6B Yahoo! Front Page Today Module User Click Log Dataset”
- Investigated the performance of UCB1, EXP3, and random strategy compared to the theoretical performance bound
- Achieved 2.6x better performance on EXP3 algorithm than the theoretical performance lower bound

### Medical Images Segmentation

Spring 2022

- Implemented U-Net with **PyTorch** to segment the blood vessels on photographs of the retina
- Trained the **neural network** with sample-splitting and output segmented images for the test image data
- Achieved <10% binary cross-entropy loss after 40 training epochs

### Representation Learning and Generative Modelling on MNIST Dataset

Spring 2022

- Performed dimensionality reduction on MNIST dataset using **PCA, Autoencoder (AE), and Variational Autoencoder (VAE)**
- Optimized binary cross-entropy loss of AE from 0.005 to 0.002 and evidence lower bound loss of VAE from 500+ to 200
- Synthesized new image data by sampling from the latent space of VAE

### R Packages Text Analysis

Spring 2021

- Performed frequency text analysis by regular expression and visualized the outcome by R data visualization tool
- Built a web application with **R-shiny** that demos the analysis of a distribution of R packages' title length

### Modified Brent's Method

Spring 2021

- Implemented the root finding algorithm proposed by Wilkens and Gu in **MATLAB**
- Performed bisection method, inverse quadratic interpolation, and secant method to reduce the numbers of function evaluations
- Achieved 92% test case coverage within tolerance of  $1e-15$  in terms of efficiency

## PROFESSIONAL & LEADERSHIP EXPERIENCE

### Statistics Course Reader | University of California, Berkeley

September 2022 - December 2022

- Assisted and graded 800+ students on homework, labs, exams weekly in Stat 20: Introduction to Statistics
- Co-managed 8 sections of lectures with Prof. Andrew Bray and other course staff on course content

### Math Tutor | Irvine Valley College

August 2019 - May 2022

- Conducted 1-on-6 weekly sections and hosted office hours for 200+ students weekly
- Designed weekly problem sets for teaching uses in fields of trigonometry, calculus, and differential equations
- Earned high satisfaction in teaching from students in Fall 2021 and Spring 2022

### Commissioner | Student Government of Irvine Valley College

August 2018 - September 2019

- Coordinated with 6 other committees on planning and advertising campus events
- Allocated \$800,000 in funds to student organizations, intercurricular programs, and scholarships