

# Bowen Yi

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## Research Interests

My research interests lie in **Human-Centered NLP**, **Behavioral Data Science**, and **Computational Social Science**. I focus on modeling social interactions and how **social roles** and **cultural differences** impact individual behaviors in **multimodal** contexts, with applications in **mental health** and education. Moreover, I design methods that leverage **causal inference**, **ML**, and social science theories to derive actionable insights from large-scale behavioral data.

## Education

Jan. 2023 Present	<b>University of Michigan - Ann Arbor</b> B.S. in <b>Computer Science</b>   GPA: 3.893/4.0 Coursework: Natural Language Processing, Human-Centered ML, Machine Learning, Computer Vision, Information Retrieval, Human-Centered Software Design and Development	Ann Arbor, MI
Sep. 2021 Dec. 2022	<b>University of California - San Diego</b> B.S. in <b>Mathematics-Computer Science</b> , Minor in <b>Sociology</b>   GPA: 3.827/4.0 Coursework: Sociology of Health Care Issues, Introduction to Sociology, Statistics, Languages and Cultures, Linear Algebra, Calculus, Programming and Object-Oriented Design	La Jolla, CA

## Publications

S=In Submission, C=Conference, W=Working Paper

- [C.1] **Examining Spanish Counseling with MIDAS: a Motivational Interviewing Dataset in Spanish** [🔗]  
Aylin Gunal, [Bowen Yi](#), John Piette, Rada Mihalcea, Veronica Perez-Rosas  
*Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics* [NAACL 2025]
- [C.2] **Causally Modeling the Linguistic and Social Factors that Predict Email Response** [🔗]  
Yinuo Xu\*, ..., [Bowen Yi](#)\*, ..., David Jurgens (\* = Equal Contribution with Random Order)  
*Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics* [NAACL 2025]
- [C.3] **The Generation Gap: Exploring Age Bias Underlying in the Value Systems of Large Language Models** [🔗]  
Siyang Liu and Trish Maturi and [Bowen Yi](#) and Siqi Shen and Rada Mihalcea  
*Conference on Empirical Methods in Natural Language Processing, Miami, USA* [EMNLP 2024]
- [S.1] **Real or Robotic? Assessing Whether LLMs Accurately Simulate Qualities of Human Responses in Dialogue** [🔗]  
Jonathan Ivey\*, ..., [Bowen Yi](#)\*, ..., David Jurgens (\* = Equal Contribution with Random Order)  
[In Submission to ACL 2025]
- [W.1] **Unveiling Behavioral Differences in Bilingual Information Operations: A Network-Based Approach** [🔗]  
[Bowen Yi](#)  
[In Submission to IC2S2 2025, Preprint on arXiv]
- [W.2] **Uncovering the Impact of Intervention Messages on Diverse Population Groups**  
[Bowen Yi](#), Rada Mihalcea, Fang Yu, Elena Frank, Joan Zhao, Srijan Sen, Maggie Makar

## Research Experience

### Behavioral Data Science

**Causal Effect of Intervention Messages on Medical Interns' Well-being** [S.4] Feb. 2024 - Present

Advisors: [Maggie Makar](#), [Rada Mihalcea](#)

- > Collaborate with **Srijan Sen's Lab** at Michigan Psychiatry to analyze 4 years of intervention message data and behavioral data from **wearable devices** for 6,000+ medical interns, including metrics such as mood, steps, and sleep.
- > Measure CATE and isolated causal effects of intervention message categories on patient subgroups, utilizing tools like EconML and scikit-learn.
- > Develop interpretable language representations for 939 intervention messages to enable valid causal inference, based on 14 expert-encoded psychotherapy categories and lexicons like LIWC.
- > Design robust subgroup-discovery methods that accommodate data perturbations and time-varying interventions, employing DoubleML and Random Forest to identify patient subgroups with significant treatment responses, demonstrating improved stability compared to baseline methods.

## Human-Centered NLP

### Simulating Culturally-Aligned Mental Health Counseling

Sep. 2024 - Present

Advisor: [Rada Mihalcea](#)

- > Simulate counselor-patient conversations in mental health from Hispanic culture using LLMs, leveraging **visual** information (interpreted using multimodal LLMs like video-ChatGPT), **speech** features (such as tone and pitch), and **text** data from the dataset in [C.1].
- > Align LLMs with doctor and patient behaviors in Spanish culture by exploring strategies such as prompt engineering, fine-tuning, **reinforcement learning**, and **multi-agent frameworks**.
- > Develop a human-LLM collaborative framework to evaluate cultural sensitivity, behavioral alignment, and counseling quality of the simulated counselor, following criteria like [ENACT](#) while reducing reliance on existing professional knowledge-based benchmarks.

### Assessing Alignment of LLM Simulated Human Responses [S.1]

July. 2024 - Sep. 2024

Advisors: [David Jurgens](#)

- > Evaluated alignment of LLM simulations with human interactions on 100,000 English, Chinese, and Russian dialogues from [the WildChat dataset](#).
- > Co-designed an evaluation framework with metrics to assess lexical, stylistic, and semantic alignment between simulated human dialogues and real human-LLM multilingual interactions.
- > Found a low alignment across all three languages among nine tested models even when prompted in the target language, particularly in lower-resource settings like Russian.

### Inspecting Age Bias in the Value Systems of LLMs [C.3]

April. 2024 - Jun. 2024

Advisors: [Rada Mihalcea](#)

- > Analyzed the alignment of social, economic, and other 11 categories of world values across six age groups in 62 countries on 6 leading LLMs, leveraging data from the [World Values Survey](#).
- > Responsible for evaluating the age bias in [the Mistral model](#) and studying the impact of age identity prompts on value misalignment.
- > Findings suggested a general inclination of LLM values towards younger demographics, especially when tested on the US population.

## Computational Social Science

### Examining Enhanced Behavioral Counseling in Spanish [C.1]

Apr. 2024 - Present

Advisors: [Verónica Pérez-Rosas](#), [Rada Mihalcea](#)

- > Collaborate with [John Piette](#) to introduce the first Spanish Motivational Interviewing dataset from 74 public videos, annotated by experts on counseling strategies.
- > Analyzed culture-driven behavioral and psycholinguistic differences between the Spanish and English therapists, such as the word-exchange ratio, language style matching, language usage (LIWC), and sentiment.
- > Designed [P-Tuning experiments](#) on multilingual and monolingual LLMs to predict counselor behaviors such as reflections and questions.
- > Investigating the impact of visual captioning in counseling videos on model performance for classifying therapist strategies and generating personalized feedback.

### Climate Change and Socio-Political Stability in Sub-Saharan Africa [C.2]

May. 2024 - Jan. 2025

Advisor: [Verónica Pérez-Rosas](#)

- > Collaborate with social scientists from [Arun Agrawal's](#) lab to examine causal relationships between climate or demographic changes and sociopolitical stability as reflected in scientific literature.
- > Develop data infrastructure, analytical models, and an automated pipeline to collect and process over 20,000 relevant scientific articles, leveraging tools like Grobid, Selenium, and BeautifulSoup.

### Uncovering the Impact of George Floyd Incident on Podcast Ecosystem [Report, Dataset]

Aug. 2023 - Jun. 2024

Advisors: [David Jurgens](#), [Dallas Card](#)

- > Modeled the topical trends (using Mallet), [political bias](#), and conversation dynamics in 600,000+ transcribed podcast episodes published from May to June 2020.
- > Investigated the impact of George Floyd's death on podcasts across 79 themes, identifying named entities mentioned with George Floyd that reflect themes of social justice and police violence.
- > Fine-tuned and calibrated language models (e.g., RoBERTa, MiniLM) to classify news content and sentiment in podcasts, with plans to incorporate **audio** features such as pitch into classifiers for better performance.

Modeling Conversational Dynamics in Email Exchanges [S.1]

Mar. 2023 - Jun. 2024

Advisor: David Jurgens

- > Analyzed 11.3M emails from the [GMANE corpus](#), identifying and measuring key conversational dynamics and social-linguistic factors of email exchanges including intimacy, formality, and cogency.
- > Created a dataset of 1,800 emails annotated for intents, expectations, and 14 pragmatic features; benchmarked models including logistic regression and zero-shot LLMs.
- > Conducted causal analysis revealing that social status, argumentation quality, and social connection influence response rates, with social status being the most significant.

Industry Experience

Software Engineering Intern | Boardx.us

Jun. 2023 - Aug. 2023

Mentor: Mr. Feng Zhang

- > Contributed to designing collaborative/interactive digital whiteboards with a focus on improving user experience and managing company data on Microsoft Azure.
- > Assisted in integrating AI chatbots to inspire creativity in user design and writing.
- > Introduced accessibility features, including color-blind-friendly design, to make the product more inclusive.

Presentations

“NLP for Enhanced Behavioral Counseling in Spanish”

- > BoF Session on Large Multimodal Models for Biomedical Research, EMNLP 2024 Nov. 2024 (Miami, FL)
- > Michigan AI Symposium, Embodied AI [Poster] Oct. 2024 (Ann Arbor, MI)
- > e-HAIL Symposium, Generative AI in Healthcare [Poster] Sep. 2024 (Ann Arbor, MI)

“Can LLMs Simulate Human Subject Studies?”

- > NLP Reading Group, Michigan AI Lab [Slides] | [Note] Sep. 2024 (Ann Arbor, MI)

“Podcast Study: Uncovering News in Non-News Space”

- > David Jurgens Lab Meeting, UMSI [Slides] Feb. 2024 (Ann Arbor, MI)

“Tutorial: Topic Modeling with Mallet”

- > David Jurgens Lab Meeting, UMSI [Slides] Nov. 2023 (Ann Arbor, MI)

Honours and Awards

University Honors, 2023 - 2024 | University of Michigan For achieving a GPA above 3.5 in every full-time term.

IEEE-Eta Kappa Nu, 2022 & 2024 | UC San Diego & University of Michigan Invited to membership for ranking in the top 25% of the junior class and top 33% of the senior class

Provost Honors, 2021 - 2022 | UC San Diego For achieving a GPA above 3.5 in every full-time term.

Teaching and Leadership

NLP Reading Group, University of Michigan Co-Organizer

Sep. 2024 - Present

- > Organize and host weekly paper presentations by designing event setups and providing speaker tutorials.
- > Communicate NLP research to attendees from CS and non-CS fields (such as Medicine and Psychology) and undergraduates with limited experience, building an inclusive community of 180 active members.

Volunteer Mentor for College Applications

Oct. 2021 - Mar. 2023

- > Supported about 10 financially challenged domestic and international students through their first-year or transfer college applications.
- > Provided constructive feedback on essay brainstorming, standardized test preparation, major and college choice, etc.

Skills

DL/ML Programming	PyTorch, TensorFlow, PyTorch-Transformers, Scikit-Learn
Programming Languages	Python, C/C++, Java, HTML/CSS
Natural Languages	Hunanese (native), Mandarin (native), English (fluent), Cantonese (conversational), German (basic), Spanish (learning), Serbian (learning)