# MEGHAVARSHINI KRISHNASWAMY

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## Objective

I am a computational linguist and phonetician building an interdisciplinary research and mentorship career. My work leverages linguistic theory and computational modeling to analyze human behavior across diverse domains, supported by robust data collection. I am dedicated to mentoring the next generation of scientists by equipping them with specialized language processing skills, data science principles, and robust human-subject research methodologies.

## Education

- **University of Arizona** *Aug 2019–July 2025*
  *PhD, Linguistics* Tucson Arizona, USA
  - GPA: 3.9/4.00

- **University of Arizona** *Aug 2019–May 2021*
  *MS, Human Language Technology* Tucson Arizona, USA
  - GPA: 3.9/4.00

- **The English and Foreign Languages University** *July 2013–May 2015*
  *MA, Linguistics* Hyderabad, India
  - GPA: 72.9%

- **University of Delhi** *July 2010–June 2013*
  *BA (Hons.), English* New Delhi, India
  - Score: 59.8%, II-Division

## Professional Affiliations and Experience

- **Center for Educational Data Science and Innovation, University of Maryland [🌐]** *Aug 2025 -*
  *Postdoctoral Associate (speech science and linguistics)* College Park
  - Implement linguistic and phonetic analysis of spoken and written communications in K–12 environments.
  - Develop data processing pipelines to support ASR and speaker recognition systems for children's speech.
  - Create AI-based tools to evaluate and enhance instructional feedback for educators.

- **SPLANG Phonetics Lab, EFL University** *Oct 2017 - Aug 2019*
  *Research Associate (phonetics and psycholinguistics)* Hyderabad, India
  - Designed and conducted acoustic phonetics experiments for languages such as Bengali, Mongolian, Malayalam and Hindi.
  - Conducted corpus analysis and qualitative assessments on multi-lingual internet corpora to find stimuli for experiments.
  - Created audio stimuli using Praat and ffmpeg for eye-tracking experiments and perception tasks.
  - Wrote R and Python scripts for statistical analysis and data visualisation.
  - Provided training to students for experimental modalities such as ultrasound, eye-tracking, and speech perception and production.

- Managed administrative tasks such as purchase requests, lab equipment setup, documentation for datasets, scheduling lab activities, and drafting the lab's budget and spending.
- My research contributed to publication [C3, C5, P1, C8, C9].

## Academic Research Experience

- **Data Science Institute, University of Arizona [🌐]** *Aug 2023–July 2025*
  *Graduate Research Assistant (NLP educator and consultancy)* Tucson, USA
  - Designed and delivered technical workshops encompassing NLP, python programming, command line interface proficiency, version control, High Performance Computing (HPC), and AI tools for research. See associated Github repository [].
  - Collaborated in creating a language processing pipeline for quantum NLP applications in low-resource languages.
  - Spearheaded a collaboration with computational linguistics faculty, for improving HPC understanding and knowledge.
  - Provided consulting services for university research projects (data science and NLP), for the successful execution and optimization of these projects.

- **DARPA ASIST-ToMCAT Project, University of Arizona [🌐]** *May 2020 - Dec 2023*
  *Graduate Research Assistant (computational linguistics)* Tucson
  - Conducted doctoral research on the efficacy of using neural network models for speech synchrony/vocal entrainment in spontaneous conversations [D1].
  - Contributed code, research insights, and qualitative assessments for vocal feature extraction using OpenSMILE, Praat and Python.
  - Reported on the viability of different voice recording platforms for collecting human subject data and automatic transcriptions, and performed quality assessments.
  - Performed literature reviews and assessed datasets for multimodal sentiment and emotion classification projects.
  - Provided documentation and writing for effective communication of our research findings for DARPA Principal Investigators (PIs) Meetings and Github documentation.
  - Contributed research to publications presented at NeurIPS, NAACL, and ICML: [W1, C1, C2, C6, C7].

- **Douglass Phonetics Lab, University of Arizona [🌐]** *Jan 2020 - Dec 2020*
  *Graduate Research Assistant (applied linguistics and phonetics)* Tucson
  - Coordinated the lab's ongoing phonetics experiments and data collection.
  - Initiated the migration of the lab's experiments to remote platforms (like Finding Five) during the pandemic, and assessed their viability.
  - Provided training and technical support to undergraduate researchers.
  - Contributed documentation for the data exploration and statistical analysis.
  - Conducted transcription and extraction of phonetic data on Praat.
  - My research contributed to publication [C4].

## Teaching Experience

- **LING314: Phonetics, [Instructor on record]** *Jan 2023 - May 2023*
  *Tools: D2L, Praat, Qualtrics* [🌐]
  - Introduced core topics in phonetic science and the articulation, acoustic processing, and perception of human speech, with a focus on the prosodic properties and the phonetic structure of different dialects of English.
  - Taught the fundamentals of transcribing sound patterns with the International Phonetic Alphabet and the terminology for phonetic features.

◦ Lead lab sessions to collect, process, and analyze acoustic features, and read spectrograms for different consonants and vowels.

- **LING432 (5-week, online), Psychology of Language [Instructor on record]** *Summer 2022 and 2023*
  *Tools: D2L, Panopto, Zoom whiteboard and quizzes* [🌐]
  ◦ Introduced topics in language processing.
  ◦ Created teaching materials on comprehension and production of sounds, words, and sentences, and the psychological processes involved.
  ◦ Lead discussions on bilingual processing, speech errors, and artificial speech.
  ◦ Designed student assignments and quizzes, and provided feedback on academic writing.
  ◦ Recorded weekly lectures on Panopto.

- **LING150, Language and the World [Grader]** *Aug - Dec 2019*
  *Tools: D2L, Panopto, MS Office suite* [🌐]
  ◦ Conducted weekly section meetings and office hours.
  ◦ Provided detailed feedback and evaluation on student's assignments.
  ◦ Supported students with the design of a constructed language and documenting its grammar.

- **Teach for India, Hyderabad** *May 2015 - Apr 2015*
  *5th and 6th grade* [🌐]
  ◦ Taught 6th grade English and Science, and 5th grade Maths and Environmental Sciences.
  ◦ Participated in and conducted rigorous teacher-training programs.
  ◦ Raised approximately 82,000 INR to set up a digital classroom, class library and fund a sports training program.

## PUBLICATIONS

C=PROCEEDINGS, P=POSTER, W=PUBLICATION IN PROGRESS, D=DISSERTATION,

C1. Pyarelal, A., Culnan, J., Qamar, A., Krishnaswamy, M., Wang, Y., Chen, C., Miah, M. M. M., Hormozi, S., Tong, J. & Huang, R. *MultiCAT: Multimodal Communication Annotations for Teams* in *NAACL 2025 Findings* (2025). https://openreview.net/forum?id=nkxpva8fN5.

C2. Soares, P., Pyarelal, A., Krishnaswamy, M., Butler, E. & Barnard, K. *Probabilistic Modeling of Interpersonal Coordination Processes* in *Forty-first International Conference on Machine Learning* (2024). https://proceedings.mlr.press/v235/soares24a.html.

C3. GP, S., Krishnaswamy, M., Mishra, R. & Dutta, I. *Mismatched coarticulatory information hinders lexical access of coronal stops in Malayalam* in *Proceedings of the 20th International Congress of Phonetic Sciences* (2023), 371–375. https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2023/full_papers/657.pdf.

C4. Krishnaswamy, M. & Warner, N. *Perception of Malayalam three-way stop contrast among American English speakers* in *Proceedings of the 20th International Congress of Phonetic Sciences* (2023), 401–405. https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2023/full_papers/682.pdf.

C5. Mitra, A., Krishnaswamy, M. & Dutta, I. *Coarticulation and contrast in a vowel harmony system: coarticulatory propensity in Khalkha Mongolian VCV sequences* in *Proceedings of the 20th International Congress of Phonetic Sciences* (2023), 2246–2250. https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2023/full_papers/1043.pdf.

C6. Pyarelal, A., Duong, E., Shibu, C. J., Soares, P., Boyd, S., Khosla, P., Pfeifer, V., Zhang, D., Andrews, E. S., Champlin, R., *et al. The ToMCAT Dataset* in *Thirty-seventh Conference on Neural Information Processing Systems Datasets and Benchmarks Track* (2023). https://papers.nips.cc/paper_files/paper/2023/file/803d8d4b4a549d0d062fc704f8659ce3-Paper-Datasets_and_Benchmarks.pdf.

C7. Culnan, J., Park, S., Krishnaswamy, M. & Sharp, R. *Me, myself, and ire: Effects of automatic transcription quality on emotion, sarcasm, and personality detection* in *Proceedings of the Eleventh Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis* (2021), 250–256. https://aclanthology.org/2021.wassa-1.26.pdf.

C8. Dutta, I., Redmon, C., Krishnaswamy, M., Chandran, S. & Raj, N. *Articulatory complexity and lexical contrast density in models of coronal coarticulation in Malayalam* in *Proceedings of the 19th International Congress of Phonetic Sciences* (2019). https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2019/papers/ICPhS_2041.pdf.

C9. Krishnaswamy, M., Dutta, I. & Banerjee, U. *Active cavity expansion through lingual adjustments to place of constriction in voiced geminates* in *Proceedings of Meetings on Acoustics* **33** (2018), 060002. https://asa.scitation.org/doi/pdf/10.1121/2.0001024.

D1. Meghavarshini, K. *Vocal entrainment in multi-party conversations: an exploration of automated and experimental approaches.* Doctoral Dissertation (The University of Arizona, 2025).

P1. Krishnaswamy, M., Dutta, I. & Bhaumik, M. *Alveolar stops exhibit greater coarticulatory resistance than retroflexes and dentals in Malayalam* The Journal of the Acoustical Society of America. 2020. https://doi.org/10.1121/1.5147168.

W1. Krishnaswamy, M., Soares, P. & Pyarelal, A. *Multi-party vocal entrainment as a timeseries problem* dissertation. Draft. 2025.

## SKILLS

- **Programming and Scripting:** Python, R, Praat scripting, bash scripting, grep, ssh, slurm
- **Web Technologies:** D2L, Google Docs, Panopto, Qualtrics
- **Data and Code Management Systems:** Pandas, Bee Keeper, Excel, git
- **NLP, Data Science & Machine Learning:** Pytorch, ScikitLearn, PyKaldi, SpaCy, NLTK, Matplotlib, Pandas, Numpy, Notebooks, WhisperAI, SpeechBrain, Ollama, Jupyter
- **NLP and Phonetics:** SpaCy, NLTK, Beautiful Soup, perl, Ollama, WhisperAI, SpeechBrain, Praat, Parseltongue, Kaldi, OpenSMILE, ffmpeg
- **Mathematical & Statistical Tools:** numpy, scipy, ggplot, lme4, dplyr, gss
- **Other Tools & Technologies:** imagemagik, HPC, Gradio
- **Documentation and editing:** LaTeX, MS Word, RMarkdown & Knitr, MKdocs, Github Pages, vim, Jupyter Notebooks

## FELLOWSHIPS AND AWARDS

- **Data Science Fellowship** *Jan - Apr 2023*
  *Data Science Institute, University of Arizona* [🌐]
  - Training for data management planning, research reproducibility and accessibility, and effective software documentation.
  - Awarded a cash stipend of $6000.
  - Submitted a paper+code sample Github repository as my capstone project [].

- **Artistic Expression of Original Research** *Oct 2024*
  *Institute for Resilience, University of Arizona* [🌐]
  - Selected to participate in a 3-day retreat, with workshops and talks on science communication, artistic techniques.
  - Created a mixed-media installation depicting my doctoral research for three public exhibitions.

- **Travel award** *July 2023*
  *Department of Linguistics, University of Arizona*

◦ Awarded $1000 towards research travel to the International Congress for Phonetic Science 2023 for presenting [C3–C5].

• **Research Fund Award** *February 2022*
*Department of Linguistics, University of Arizona*
◦ Awarded $800 towards experimental research contributing to publication [C4].

## Leadership Experience

• **Coordinator, Arizona Linguistics Circle Conference** *May 2022 - Oct 2021*
*University of Arizona* [🌐]
◦ Build the Easychair abstracts submission portal.
◦ Recruited reviewers and coordinated the double-blind peer review.
◦ Managed all communications with authors.
◦ Created documentation for all procedures.

• **Coordinator, Arizona Linguistics Circle Conference** *May 2021 - Oct 2021*
*University of Arizona* [🌐]
◦ Managed social media accounts across multiple platforms.
◦ Created PR materials for disseminating information on the conference.
◦ Created profiles for authors and their submissions.

• **Office bearer, Arizona Linguistics Circle** *Jan 2021 - Present*
*University of Arizona* [🌐]
◦ Represented the student body in faculty meetings.
◦ Managed equipment and amenities in the student spaces.
◦ Mentored incoming graduate students.
◦ Volunteered in presentations and university showcases.

## Service

• **Instructor, Software Carpentry Workshop** *March 2025*
*University of Arizona* [🌐]

• **Instructor, Software Carpentry Workshop** *December 2023*
*University of Arizona* [🌐]

• **Reviewer, Cayote papers** *Oct 2021*
*University of Arizona* [🌐]

• **Reviewer** *Mar 2023*
*Peer J Computer Science* [🌐]