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OBJECTIVE

I am a computational linguist and phonetician. I am interested in an interdisciplinary research career and mentorship role, where I can work with language and behavioural data, and applied computational methods. I want to mentor the next generation of scientists, with a focus on data science principles, project management, and quantitative and qualitative methods for human subject data collection. I aim to add to their knowledge and experience in experimental and applied linguistics.

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

ACADEMIC RESEARCH EXPERIENCE

- **Center for Educational Data Science and Innovation, [🌐]** Aug 2025 -
Postdoctoral Associate College Park
 - Provide language science expertise for providing teachers data-driven teaching feedback.
 - Building pipelines for building speech models for automatic speech recognition of children's speech.
 - Set up linguistic and phonetic analysis on spoken and written communications generated in K12 teaching environments.
- **Data Science Institute [🌐]** Aug 2023–July 2025
Graduate Research Assistant (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 (NLP)** [🌐] May 2020 - Dec 2023
Tucson
Graduate Research Assistant
- Designed and enhanced existing unsupervised neural network models for detecting speech synchrony/entrainment [🌐].
 - Conducted doctoral research on vocal entrainment [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 (applied linguistics)** [🌐] Jan 2020 - Dec 2020
Tucson
Graduate Research Assistant
- 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].
- **SPLANG Phonetics Lab (phonetics and psycholinguistics), EFL University** Oct 2017 - Aug 2019
Hyderabad, India
Research Associate
- 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.
 - Co-authored papers, conference posters, research proposals and presentations.
 - 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].

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:** L^AT_EX, 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 