Reflective Essay

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I have been at MSU since the fall of 2009; as a fixed term Assistant Professor with Designation B till 2019, and since then as a tenure track Assistant Professor in Phonetics. My work employs experimental techniques to study the knowledge of the abstract speech patterns that a person has when they know a language (or phonological knowledge) and the use of the knowledge as observed in the phonetics (be it speech perception or speech production). My years at MSU have had a tremendous impact on me as a researcher, educator, advisor, and a member of the university community. In what follows, I detail both my experiences with and my plans for research, teaching, advising and service.

1   Research

I graduated from the University of Delaware with a PhD in Linguistics in 2010. My dissertation proposed a particular abstract representation of consonants that are partly nasal ("partially-nasal stops") to account for their behaviour in the world's languages. I largely used the traditional phonological technique of analysing words and phrases that contain the relevant sound patterns elicited through informal experiments. However, some of the crucial data came from my phonetic field-work in the Province of Jambi in Sumatra, Indonesia on the local dialects of Malay.

After my dissertation, my research has been animated by a need to go beyond traditional techniques, which often do not allow us to distinguish between multiple, reasonable, competing hypotheses about the underlying system. Furthermore, I wanted to develop clear linking hypotheses between phonological knowledge and phonetics. Consequently, I moved to formal experimental research in the vein of what is called *Laboratory Phonology* in the field. The grander hope I have is that by building clear bridges between phonological knowledge and phonetics, we will be able to restrict the hypothesis space for both phonological and phonetic theories and thereby achieve further clarity in our understanding of the two domains. However, the aim of developing clear linking hypotheses between speakers' linguistic knowledge and its use is confounded by multiple interacting cognitive factors; therefore, I have adopted a variety of experimental techniques and probed a variety of languages in an attempt to triangulate the evidence.

Given that my work involves multiple experimental techniques and multiple languages, I often collaborate with other researchers with the relevant experience and technology. Furthermore, I think it is important for faculty to encourage and give credit to undergraduate/graduate student involvement in research. Consequently, my research is highly collaborative. To date, I have published 11 peer-reviewed journal articles — many of these are in the flagship journals *Phonology* and *Journal of Phonetics* — and 10 refereed conference proceedings. There are two more journal manuscripts under review, and many more papers in preparation. In the last few years, I have given invited plenary talks at two important annual international conferences in my field: The North American Phonology Conference in 2016, and The Annual Meeting on Phonology in 2020 — I take these invitations as evidence that my work is both exciting to and valued by colleagues in my field. In what follows, I discuss my core research interests, accomplishments and plans.

Establishing links between phonological knowledge and speech perception: Recent work in speech perception has uncovered the phenomenon of *illusory vowels*, whereby listeners hallucinate vowels in segmental contexts which are disallowed by their language (e.g., Japanese speakers hear [ebuzo] when auditorily presented with [ebzo]). This phenomenon has proved to be a fantastic window into how and what kind of phonological knowledge is implicated in speech perception. In work on the topic, I have argued that the task of the listener in speech perception is primarily one of

reverse inference: it is to identify the best estimate of the abstract intended underlying (phonemic) categories of the utterance for the incoming acoustic token. Since reverse inference to underlying representations is only possible when a listener uses knowledge of phonological and phonetic patterns of a particular language and the acoustics of the input tokens, we naturally account for the burgeoning list of phonological and phonetic effects observed in the literature on perceptual illusions. Furthermore, in line with the general prediction of the above viewpoint, I have explored multiple languages (American English, Japanese, Mandarin Chinese, and South Korean) and have shown evidence of phonological alternations (Durvasula and Kahng 2015), prosodic knowledge (Durvasula and Kahng 2016) and the possibility of multiple different illusory vowels in the same language (Durvasula et al. 2018; Durvasula and Kahng 2015). My long term plan for this line of research is to develop precise quantitative models of such auditory illusions couched in a more general theory of speech perception along the lines sketched out above.

In recent years, neurolinguistic research has provided another exciting avenue to understand the nature of linguistic knowledge. One especially nuanced proposal suggests abstract phonological representations can be separated from more concrete phonetic realisations through the patterns of Mismatch Negativity (MMN), a neurophysiological measure of perceptual similarity, observed under a specific experimental protocol. I realised that the hypothesis could be probed further using analytic results from the recent viewpoint of "laryngeal realism", wherein different languages have been argued to have different representations for laryngeal contrasts (e.g., b vs. p). Therefore, I reached out to Dr. Arild Hestvik (one of my graduate school professors), who is an expert neurolinguist and had the relevant Electroencephalography (EEG) technology. The work resulted in two collaborations looking at American English (Hestvik and Durvasula 2016) and Japanese (Hestvik et al. 2020). Consistent with the viewpoint of "laryngeal realism", we observed that the laryngeal contrasts in American English and Japanese have opposite MMN asymmetries. These results are particularly exciting because the methodology allows us to make direct contact with early perception, thereby allowing us to side-step confounds that appear due to post-perceptual processing in more traditional behavioural results. I plan to continue probing and clarifying the specific linking hypothesis to develop a much better understanding of the language faculty at large.

Establishing links between phonological knowledge and speech production: In this strand of my research, I have focussed on syllabic or sub-syllabic representations, and have tried to argue that it is possible to probe gradient, high-dimensional phonetic data to get clear and systematic answers to questions about categorical, low-dimensional phonological representations.

In Durvasula and Huang (2017), I analysed vowel nasalisation patterns in acoustic recordings of Michigan English to study *ambisyllabic consonants* (e.g., in English, the consonant [n] in the word 'money' has been claimed to be part of both the first and the second syllable simultaneously). None of the data revealed any "intermediate" patterning of ambisyllabic consonants in the phonetics as would be expected by the standard position — this suggests that they are possibly never simultaneously linked to two adjacent syllables. In subsequent work that I am currently writing up, I present further evidence from consonant duration measurements for the absence of any intermediate patterning. The results also suggest that syllables are discrete units following a rather classical view, and not fuzzy phonetic units as has been argued by some more recently.

In Durvasula et al. (forthcoming), I looked at American English and Jazani Arabic to establish that there are consistent correlations between the syllabic organisation of consonant sequences and temporal stability metrics that are observable through an analysis of acoustic measurements. Similar correlations observed in articulatory measurements have been called "C-Centre" and "Right-edge" stability patterns. The results speak to the possibility that, contrary to what is thought to be a

well-established claim, there are in fact consistent signatures for syllable structure in the acoustics; however the signatures are not present in any *single* acoustic token; instead they are observable in the *pattern of structured co-variation* across tokens. Furthermore, because acoustic recordings are much easier and cheaper to collect than articulatory measurements, this strand of research is particularly exciting as it paves the way for much more extensive lab-based and fieldwork-based phonetic studies of syllable structure in other languages.

Finally, in some recent work (just submitted to a journal) based on an on-going collaboration with Jason Shaw (Yale), Sejin Oh (CUNY), and Alexei Kochetov (University of Toronto), I explore the fundamental question of what it means to be a *single* segment/sound in abstract phonological representations. The crucial linking hypothesis was developed by Jason Shaw and me in initial collaborative work that started when I reached out to him with the original idea. We proposed that segmenthood is related to specific temporal co-ordination patterns of gestures in articulation. We have already shown preliminary support for this hypothesis by looking at fine-grained articulatory phonetic measurements of secondary palatalisation versus segment sequences (e.g., p^j vs. pj) using Electromagnetic Articulography (Shaw, Durvasula, and Kochetov 2019). As with my work on temporal stability metrics in the acoustics, the primary motivation behind this research is to find consistent signatures of abstract (categorical) phonological representations in high-dimensional phonetic manifestations.

Probing constraints on phonological knowledge through artificial languages: In this strand of research, I set out to understand the limits on the types of phonological generalisations that speakers have. In Durvasula and Liter (2020), I studied some formal biases that learners employ in acquiring patterns from data that are consistent with multiple generalisations. The results from a series of artificial language experiments suggest that, at least for phonotactic sequence patterns, learners are able to keep track of multiple generalisations; however, the generalisations they learn are only the simplest ones consistent with the data. This suggests that there is a formal simplicity metric employed by learners while learning phonological patterns. We are currently running further experiments that probe the nature of this abstract bias.

Going forward: I plan to continue using multiple languages and multiple techniques in order to identify crucial patterns that provide windows into the abstract computational system involved in phonological knowledge. Furthermore, after the pandemic-related delay, I will direct the new MSU *Phonetics Lab* that will have its own Electromagnetic Articulography system - a technology that is still relatively rare in the field. This will allow me to forge further ahead in the field while simultaneously making me less reliant on external researchers for technology.

The current zeitgeist in the field is to try to analyse observed sound patterns with gradient or computationally intense probabilistic models, which thereby claim that the underlying human phonological system is quite powerful/expressive. Relatedly, there are suggestions that phonological knowledge is co-extensive with fine-grained and high-dimensional phonetic patterns. In my future work, I plan to explore whether such powerful models are truly necessary, or if far simpler categorical models of human phonological systems are both sufficient to account for the extant data and can make interesting new contact with phonetics (in production and perception). In my aforementioned Annual Meeting on Phonology (2020) plenary talk, I explored the possibility that speakers' phonological generalisations are categorical in nature. I argued that the extant results related to speaker phonetics (production) and to what speakers find acceptable in their language are perfectly consistent with nuanced categorical models of phonological grammar and representations.

2   Teaching & Advising

Teaching: I have taught a range of courses at MSU, many of which I created myself. These include introductory courses to Linguistics, Cognitive Science and Data Analytics, and multiple undergraduate and graduate courses in Phonology and Phonetics. I created multiple new courses even while being a fixed term faculty with a heavy course load for 10 years and maintaining an active research profile. Furthermore, through these courses, I was able to modernise the curriculum and introduce students to experimental and statistical approaches in the classroom. The courses have led many undergraduate and graduate students to explore new research ideas — many of which have led to work that my students have presented at conferences, continued as PhD comprehensive papers and dissertations, and published as journal articles. The courses have also helped my development as a researcher and have led to many of my conference presentations and publications.

While I was a fixed term faculty member, I consistently received excellent evaluations from students, and always had one of the highest annual evaluations amongst the fixed term faculty in my department. Since 2019, as a tenure track faculty member, I have continued to receive high ratings both from my students and annual departmental evaluations, and was honoured to be a recipient of an #iteachmsu Award in 2019.

Advising: I have successfully advised/co-advised four PhD dissertations, four MA theses, and 25 BA theses. I have also been a member of fifteen PhD committees, and four MA committees. Currently, I am a co-chair of three PhD committees, and a member of another six PhD committees. Beyond this, I have also been the lead advisor on eighteen qualifying doctoral research papers. I would like to note that as a fixed term faculty I could not (solely) chair a committee. However, the advising load I had during that period was commensurate with most active tenure stream faculty. I take my being on so many committees as a co-chair or as a member as evidence that I was a valuable advisor/mentor to the students. The experience throughout has been highly rewarding and has enabled me to clarify my own positions on various theoretical and experimental issues.

As an advisor and mentor, I have helped the development of the students in my programme in multiple ways. First, in an effort to build student confidence and give them exposure to research beyond coursework, I have invited students to collaborate on topics of interest to me and to publish/present together. In fact, I have multiple collaborations with my students and for the aforementioned plenary talk at The North American Phonology Conference in 2016, I invited my student (Adam Liter) to co-present. Second, I have held numerous workshops in the Linguistics programme related to technical skills (Praat scripting, R programming, LaTeX, experimental and citation software) in order to boost student performance overall, and also help those without previous exposure to such skills. Finally, in recent years, I have met with linguistics students (not just students interested in Phonology/Phonetics) before summer break to set achievable and healthy goals so that they are productive while also re-charging for the Fall semester. Given my efforts, it was particularly gratifying to be nominated by the Linguistics students and fellow Linguistics faculty for the MSU Graduate School's *Outstanding Faculty Mentor Award* in 2020.

And beyond: Since 2012, with Dr. Yen-Hwei Lin, I have been co-director of the *Phonology-Phonetics Research Group* (link: `http://msuphongroup.weebly.com`). The group affords students an opportunity to get hands-on experience with state-of-the-art research. It further provides students with a supportive and nurturing environment to both workshop incipient ideas that need further discussion, and fine-tune research presentations before conferences (many of which are top conferences in the field). While the group has been quite beneficial for the students and has attracted much higher quality graduate applicants in the last few years, I also see room for growth,

and plan to build on the successes while I establish the new *Phonetics Lab* in the coming years.

I believe both as a teacher and as an advisor, my fundamental role is to set up my students for success – which involves not just academic excellence, but also a healthy attitude towards learning/research, and towards balancing those goals with other aspects of life. Therefore, I have tried to, and will continue to, balance the push for academic rigor with compassion and respect.

3   Service

Service to the field: I am on the editorial board for the *Journal of South Asian Linguistics* (2016–present), and have been a reviewer for a variety of highly respected journals and conferences. In addition, I co-organised the 21st Midcontinental Phonology & Phonetics Conference at MSU in 2016. Furthermore, in collaboration with two former students, I founded a group that tracks gender bias in Linguistics — this has now become a multi-university collaboration with many more members. This on-going work that is meant to be accessible to all is available at a website created primarily by Adam Liter and me (link: https://biasinlinguistics.org/).

Another way in which I have tried to serve my field is by making the data, analyses and pre-prints for my recent research easily and freely accessible on my website and through online repositories that are linked to in my papers. I believe, going forward, such sharing will be crucial not only in the development of the field, but also in giving better access to researchers from the Global South, who often do not have institutional access to relevant information sources.

Service to MSU: At the outset, I would like to note that service opportunities for fixed term faculty members in our College were limited until very recently. I did however take up opportunities within my program and department, and I look forward to serving the College and University more broadly in the years to come.

As with my research work and my teaching/advising, it is quite important to me to create a healthy and respectful environment. This starts with respecting others' opinions, particularly when I don't agree with them. With this attitude, I have contributed as a member of a variety of committees (fixed term and tenure track annual evaluation committees, faculty search committees, fellowship committees, amongst others). In order to help the university more generally, I was also part of a multi-college *R Bootcamp committee* in 2018, which was set up to organise a multi-day R workshop led by Dr. Stefan Th. Gries (University of California, Santa Barbara). At the department level, I was part of a committee in 2019-2020 that developed student course evaluation forms that reflected fixed term faculty performance more fairly. I am particularly proud of my involvement in the creation of the department *Community Norms Document* in 2019-2020 — the work was extensive and involved bi-weekly meetings over a period of a year and a half, diverse reading materials, and multiple focus groups with staff and faculty in the department. I believe the document is an important starting point to developing a healthy and supportive work environment for all within our department. Finally, at the programme level, I was an active contributor to the discussion and formal proposals for updating the Linguistics graduate curriculum in 2020 — these changes have now been adopted by the programme.

Looking forward, I am excited about contributing as a member of the committee to update the linguistics graduate student annual review process (2021-2022), a member of the *Department Advisory Committee* (2021-2023), and the *Convenor* for the Linguistics programme (2021-2023). All three roles afford me the chance to further the mission of the college and the university of improving academic excellence without sacrificing diversity, inclusiveness and equity — a mission that aligns with my own vision for the future of academia.