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1 Introduction

Real-time sociolinguistic studies are still relatively rare, but they have become more common in recent years as the body of earlier sociolinguistic research grows. The scope of the questions addressed in many of the real-time studies carried out to date has, however, been limited mainly to one of two discussions: those that examine the trajectory of change for particular variables and those that explore the extent to which a later study confirms hypotheses that emerged from apparent-time research.¹ While insights gained from these questions are important to our understanding of language change, I suggest that extending the scope of real-time research—specifically to an analysis of changes in the social embedding of linguistic variables over time—can provide valuable information about the ways in which linguistic changes are actually instantiated throughout a speech community. In this paper, I examine the use of several phonological features of AAE by African American speakers in Detroit at two periods of recording, separated by more than 35 years, in order to determine not only the overall increase or decrease of variants' use, but also the changing social distribution of those variants.

2 Methods

2.1 Speakers

In this project, I analyze the speech of 24 African American speakers from Detroit. Of these 24 interviews, twelve are from the corpus collected by Shuy, Wolfram, and Riley in 1966 and twelve are from a contemporary corpus of interviews collected between 1998 and 2004 by researchers at the University of Michigan. The speakers were all career-aged adults, ranging in

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¹Sankoff (2005), for instance, provides a thorough review of real-time results in order to evaluate the effectiveness of the apparent-time hypothesis in predicting linguistic changes.

age from 30 to 55.

Both the 1966 and the contemporary samples include an equal number of male and female speakers. Further, speakers from a range of social status backgrounds are included in each sample. Speakers' social status was estimated on an index (based loosely on that employed by Wolfram 1969) that includes speakers' occupation and education, with occupation weighted more heavily. In this index, the highest social status levels of education and occupation receive lowest scores. This results in an inverse relationship between the index score and social status; the highest status speakers in the sample have scores of 13, while the lowest-status speakers have scores of between 90 and 100.

2.2 Variables

For each speaker, I analyzed tokens of four variables: /ai/ preceding voiced consonants (as in *ride* and *time*, hereafter referred to as (aiV)), /ai/ preceding voiceless consonants (as in *like* and *right*, hereafter referred to as (aiVL)), non-initial (r) (as in *car*, *porch*, *bird*), and syllable-final (d) (as in *good* and *had*). I separated /ai/ diphthongs into separate variables because, as work on the phonology of AAE has reported, /ai/ tokens preceding voiced consonants traditionally show glide reduction, while those preceding voiceless consonants do not. Anderson's (2002, 2003) research in Detroit suggests that this context-based distinction is weakening among contemporary Detroit speakers, but these traditional differences require that I treat these diphthongs as separate variables.

I measured up to 30 tokens of each variable per speaker. These tokens were taken from the casual interview section of each set of recordings. While the 1966 recordings included a reading passage, the contemporary interviews did not, and I excluded tokens from that section of the 1966 interviews from the current analysis. Further, word lists were not used in either set of interviews.

The amount of glide reduction for the /ai/ variables was measured acoustically by taking, at two different points in the vowel, F2 measures for (aiV) and F1 and F2 measures for (aiVL),² using a 25 ms Hamming window. The first of these measurements, positioned at the one-quarter point of the vowel, represents the F1 and F2 values of the nucleus vowel, /a/; the second, positioned 52.5 ms from the vowel offset, represents the F1 and F2 of the offglide vowel /i/. By subtracting the values of the nucleus measure from the values of the offset measure, I found the F1 and F2 trajectories over the

²F1 was not measured for (aiV) tokens because many of these diphthongs occurred before nasals, which interfered with the F1 of the preceding vowels.

course of the diphthong. If the result of the subtraction were close to zero, the vowel trajectory would be relatively flat, indicating little diphthongization. If, however, the difference were large, the trajectory would be relatively steep, indicating a diphthong. Thus, the outcome measure I used in the statistical analyses was the difference in values between the offset and nucleus measures of /ai/.

The remaining variables, non-initial (r) and syllable-final (d), were coded impressionistically. Realizations of non-initial (r) were coded into two variant categories: those with and without a clear [r]-like constriction, labeled r-1 and r-0 respectively. Syllable-final (d) realizations were coded into three variants: [alv] (which include [d], [t], and glottalized tokens with an audible alveolar closure), [ʔ], and [Ø].

Since the methods used for the measuring the vocalic variables (aiV) and (aiVL) resulted in continuous data (i.e. the difference between the two points of measurement for both F1 and F2), I analyzed the data using a Mixed Model, which is similar to a traditional linear regression model but which allows me to account for the nesting of the overall amount of tokens within the 24 speakers in my sample. For the consonantal variables, however, my impressionistic coding measures resulted in categorical data, which required the use of logistic regression models. I employed a Generalized Estimating Equations model for these data, which, like the Mixed Model, allowed me to account for the nesting of the data.

3 Results

The analyses of the four variables described above show that they have undergone very different patterns of change over time and that they are socially embedded differently among Detroit speakers.

First, the statistical analyses of the two /ai/ variables indicate that the glide reduction in neither (aiV) nor (aiVL) has changed significantly over time. Further, the degree of social embedding of each of these variables has not changed significantly either. Figure 1 shows the mean F2 difference by year and gender for (aiV) tokens. The multivariate model shows that the large differences in glide reduction between male and female speakers is significant at both years of recording, and that this gender difference does not change significantly over time. By contrast, the relatively smaller difference in means between 1966 and contemporary speakers is not shown to be statistically significant in the multivariate model.

Similarly, Figure 2 compares F2 difference with social status for (aiV). The results follow the same pattern as those in Figure 1. The slope of each fit line in Figure 2 displays a significant difference in glide reduction by status:

higher status speakers (or those with the *lowest* social status index scores, as described above) have less glide reduction than do lower status speakers in both years of recording. The similar slope for the fit lines of both years of recording illustrates the fact that this relationship between social status and glide reduction has not changed significantly over time. Finally, the small difference in F2 means between the 1966 and contemporary speakers is, once again, non-significant.

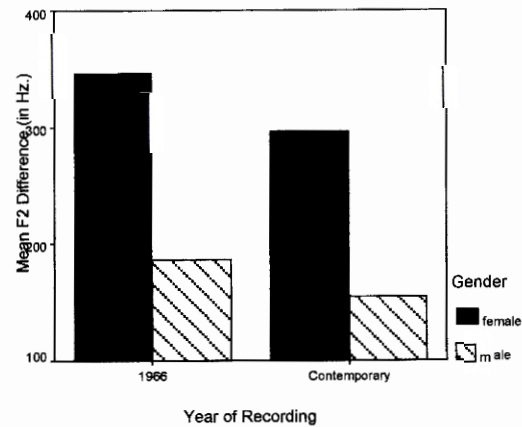


Figure 1: (aiV) by gender and year of recording

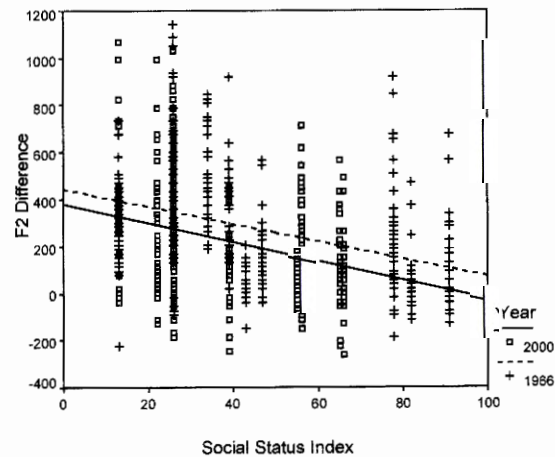


Figure 2: (aiV) by social status and year of recording

The same patterns of change over time, both in the overall use of the variable and of its social embedding, that were demonstrated by (aiV) are true of (aiVL) as well. Both the F1 and F2 difference measures for (aiVL) show that glide reduction has not changed significantly over time. Further, the social embedding has not changed over time. The correlation of glide reduction with gender in (aiVL) tokens is very similar to that of (aiV), which was illustrated in Figure 1 above. Given this similarity to (aiV), I do not present a figure to illustrate this relationship between gender and (aiVL) glide reduction. The correlation of (aiVL) glide reduction with social status, however, does differ from (aiV) tokens. As Figure 3 shows, the fit lines between social status and (aiVL) glide reduction is nearly flat, suggesting that the two are not closely related in either year of recording. In fact, the statistical model for this variable indicates that social status and (aiVL) glide reduction are not significantly related in either recording year, and the amount of correlation between the two does not change significantly over time.

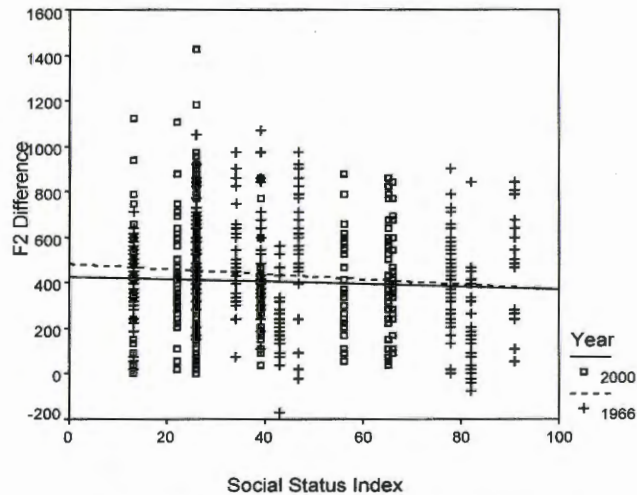


Figure 3: (aiVL) by social status and year of recording

By contrast to the /ai/ variables, which show no change over time, both consonantal variables show dramatic changes, both in their overall use and their social embedding. First, non-initial (r) use shows large and highly significant changes over time. The r-0 variant was used in 33% of all tokens by 1966 speakers, and in only 13% of tokens by contemporary speakers. The statistical analysis shows that this decrease in the overall frequency of use of

the r-0 variant has been accompanied by significant changes in the correlation between r-0 use and both gender and social status. Figures 4 and 5 illustrate these changing relationships.

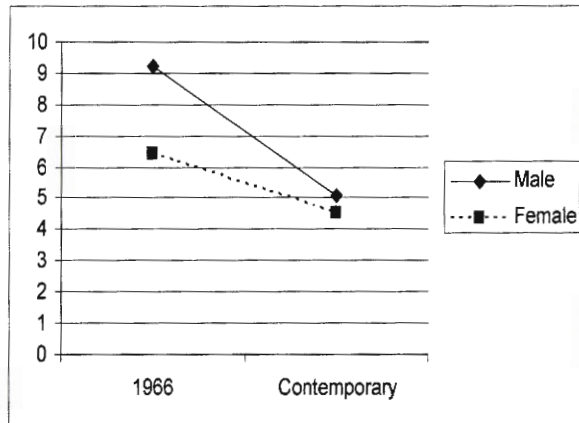


Figure 4: r-0 use by gender and year of recording

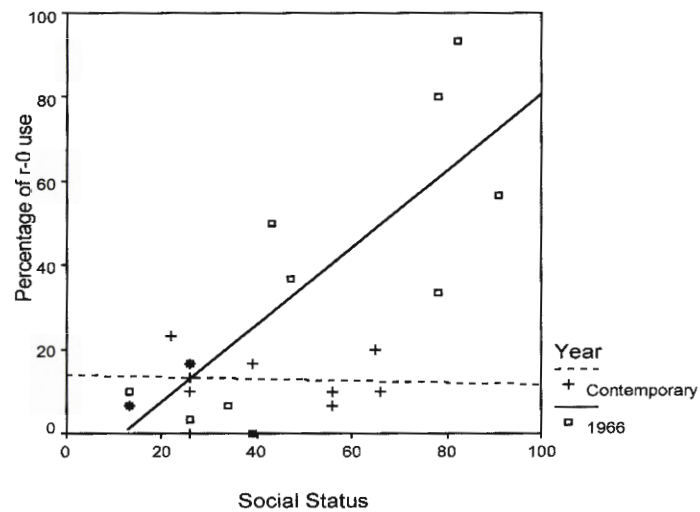


Figure 5: r-0 use by social status and year of recording

In Figure 4, the estimated coefficients that result from the statistical model for this variable are used to show the patterns in the relationships between gender, year, and (r) use. The higher numbers on the vertical axis indicate a higher frequency of r-0 use. As Figure 4 shows, men use more r-0 than women in both years of recording, but the gender gap has shrunk significantly over time, as the overall use of r-0 has decreased. Similarly, in Figure 5, the fit line between social status and r-0 use in 1966 is steep, indicating that higher social status speakers use the r-0 variant less frequently than lower status speakers. The flat fit line for the contemporary speakers, though, shows that this relationship between social status and r-0 use no longer exists. The statistical analysis bears out these changing relationships; among 1966 speakers, social status and (r) use are significantly related while among contemporary speakers, they are not. Further, the statistical model indicates that the relationship between (r) use and social status has changed significantly over time (i.e. the slopes of the two fit lines in Figure 5 are significantly different from one another).

While the analysis of non-initial (r) use shows significant change over time with the traditional AAE variant becoming less common, the analysis of syllable-final (d) shows a pattern in which variants specific to AAE speakers have become more common over time. The [alv] variant has decreased to less than half its earlier use, being used in 73% of tokens in 1966 and in just 35% of tokens contemporarily. Figure 6 shows the relationships between gender, year, and syllable-final (d) use.

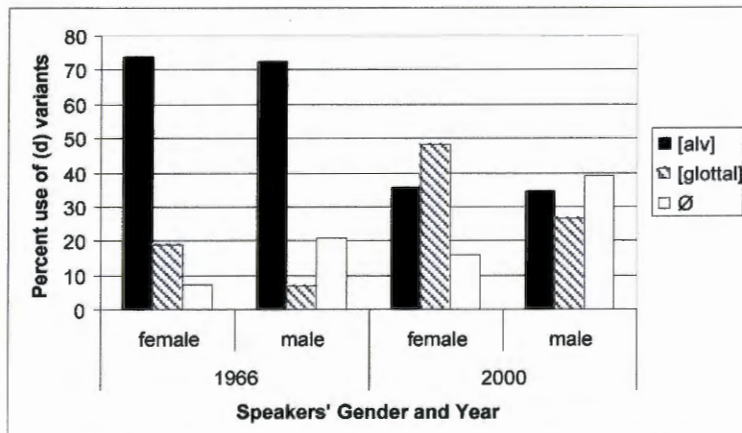


Figure 6: Syllable-final (d) use by gender and year of recording

As Figure 6 shows, while the decrease in [alv] use has occurred to an equal

extent across social status and gender, the selection of variants ([ʔ] versus [Ø]) that are used as alternates to [alv] is significantly correlated with social factors. The statistical analysis shows that the relationship between gender and non-[alv] variant is significant, with women preferring the [ʔ] variant and men preferring [Ø] variant. The level of this gender difference is not changing significantly over time; however, the relationship between non-[alv] variant and social status *has* increased over time. Figure 7 shows this relationship.

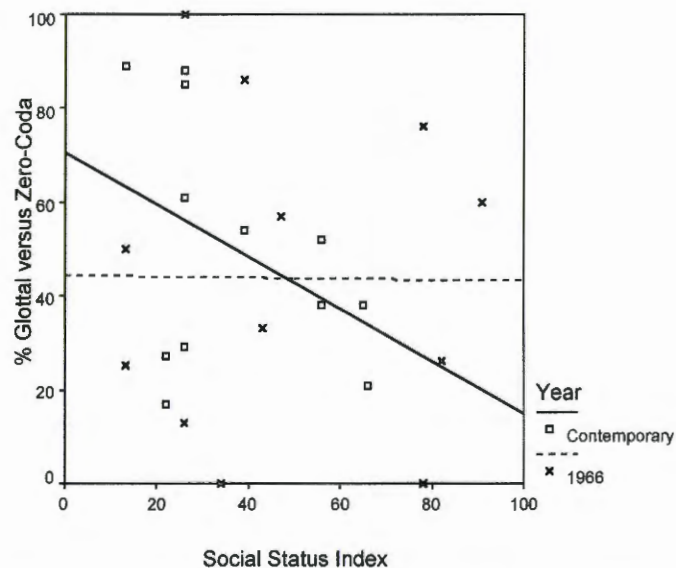


Figure 7: Use of [ʔ] versus [Ø] for syllable-final (d) by social status³

The flat slope of the fit line for 1966 speakers indicates that the choice of [ʔ] versus [Ø] was unrelated to social status in 1966; the steep slope for the contemporary speakers, however, shows that this is no longer the case. As Figure 7 shows, speakers of higher social status (or those with the lowest social status index scores) have a higher use of [ʔ] compared with [Ø]. The

³It is important to note that Figure 7 illustrates the relationships only between social status and the non-[alv] variants [ʔ] and [Ø]. As mentioned above, the use of [alv] itself is unrelated to social status; speakers across the status continuum have moved from [alv] to non-[alv] variants to a similar extent.

statistical model for syllable-final (d) shows that the contemporary relationship between [ʔ] and social status is indeed significant, and has increased significantly over time.

The results presented in this section have shown varied patterns. Both /ai/ variables have shown no change in overall glide reduction over time, and have also shown no change in their social embedding. Non-initial (r), by contrast has undergone large changes in use. The traditional AAE variant, r-0, has declined in use and the level of social correlation of (r), both with gender and social status, has declined as well. Syllable-final (d) use has also undergone dramatic changes over time. For this variable, however, the use of the AAE-specific variants [ʔ] and [Ø] has increased, and their level of social correlation, specifically with social status, has increased significantly as well. In the discussion that follows, I suggest that these patterns provide useful information about the ways changes move through speech communities.

4 Discussion

The statistical results for the variables discussed above show interesting patterns regarding the frequency of use of the variants I analyze and the level of the variable's correlation with social factors; these patterns, in turn, suggest possible conditions for variables' assumption of social patterning.

First, it appears that variables that are stable over time (i.e. those for which year is not a significant predictor) also maintain stable social correlations over time (i.e. year by gender and year by status interactions are not significant predictors). Conversely, variables that have changed over time (i.e. those that are significantly different among contemporary speakers relative to 1966 speakers) have also changed in their level of social correlation. Further, the strength or number of significant social relationships that a variable has appears to increase over time if the overall distribution of the lesser-used variants has increased and decreases if the frequency of the already less frequently used variants has decreased. In this section, I discuss each of these patterns in relation to the results described in Section 3.

First, both the (aiV) and (aiVL) variables are stable. For both of these variables, the amount of glide reduction has not changed significantly over time for either variable. Further, as discussed above, the gender- and status-related correlations of both have remained constant. Thus, of the variables examined in this project, the two that have remained stable over time have also maintained the same social relationships over time. The stability of these social relationships suggests, likely more strongly than is the case for the variables discussed below, that (aiV) and (aiVL) are indeed used as social markers by Detroit African American speakers.

By contrast, the analyses of (r) and (d) provide a basis for examining the possible relationships between variability and the social correlations of variants. In the following discussion, I focus specifically on the period of decline in variability in order to describe several hypothetical patterns for the spread of changes through a speech community, using the early period of non-initial (r) use to illustrate the possibilities.

One possibility for the instantiation of phonological changes is that the speakers who use the declining variant most (e.g. in the case of (r), lower status males use the r-0 variant more frequently than do other speakers) would maintain it longest and those who use it least (e.g. higher status females, in the (r) example) would be the first to give it up entirely. The result of this process would be that at the final stages of a variant's use in a community, it would actually reach its greatest level of social differentiation, with only the speakers who were at one time the highest-frequency users of the variant still maintaining its use. The statistical model for this type of decline in the frequency of a variant's use would show interactions between year and status and year and gender, but these interactions would be in the direction of strengthening the statistical relationship when the variant's use has declined and weakening the statistical relationship when it has increased.

A second possible pattern of variant decline is for all speakers to lose the variant proportionally. Both the most- and least-frequent users of the declining variant would show the same percentage of variant loss over time. The statistical model for this manner of changing social correlation would show a main effect for year, but not for the interactions of year by gender and year by status, since the change would affect all groups of speakers evenly.

A final possibility for the relationship between social correlations and a variable's changing use is for the group of speakers who use a declining variant most to be the first to lose it; over a period of decline, the variant's use by this group of speakers would gradually come to equal that of the group of speakers who had once used it least. At that stage, the variable's correlation with social factors will have been largely neutralized. Because of the absence of social correlation, the tokens of the variant that do still occur in the community would be relatively randomly divided among the community's speakers. The statistical model for this final type of pattern, applied to the current data, would show interactions between year and status or year and gender, in the direction of the associations between one variant's use and the group that used it most becoming weaker over time.

This final pattern is, of course, the one that we find for contemporary speakers' use of (r). With the r-0 variant being used only around a third as frequently by contemporary speakers as it was in 1966, the degree of social

correlation has lessened significantly (in the case of gender relationship) or disappeared entirely (in the case of social status stratification). A statistical relationship does still exist between gender and r-0 use, but this is a much weaker relationship than it was in 1966. Further, the level of stratification by social status, which was remarkably clear among 1966 speakers, has disappeared entirely among contemporary speakers; what little r-0 still remains in the community is now used evenly by speakers of various status levels.

Thus, the statistical model for predicting (r) use shows significant interactions between year and gender and year and status. In both cases, this interaction reflects the fact that the group that had most used r-0 in 1966 (lower-status speakers and men) changed more over time than the groups of speakers who had least used the variant. In fact, the two contemporary speakers with the highest frequency of r-0 use are among the highest status speakers in the contemporary sample.

The fact that, of the possible patterns of loss that groups of speakers could follow, the final pattern is the one that appears in the data for non-initial (r) suggests that variables may need to maintain a level of variability in the community in order to be used significantly differently by social groups. Several reasons for this are possible, and distinguishing among them would require a knowledge of the actual social meaning of the variants.

In this paper, I have discussed the changing patterns of *usage* among different social groups but I have stopped short of referring to patterns of meaning that variants assume or lose in the community. The data I have in this project allow me to look only at how variables are used by speakers, but not the ways in which they are *ideologized* by community members. This difference is an important one; in the paragraphs below, I propose several possible factors that may underlie the changing use and social correlations of linguistic variables, once again using data from non-initial (r).

If we assume that the sharp social stratification of (r)-use in 1966 indicated that r-0 was socially stigmatized and perceived by members of the community as being used by lower status speakers, then the attrition of the r-0 variant over time could either be a cause or an effect of the social correlation of (r)-use.

In the first of these possibilities, the assumption is that r-0 is disappearing in the community for unspecified reasons. As community members hear the r-0 variant with decreasing frequency, they are no longer able to associate its use with any particular group of speakers and it loses its indexical function. In short, the social correlations of (r) decrease because the use of the r-0 variant decreases.

In the second possibility mentioned above, the decrease in the use of the r-0 variant is the effect of the social meaning of the variable in 1966, rather

than the cause of changing social correlations. This would mean that speakers stop using r-0 to as great an extent as they used it in 1966 because the variant was so closely associated with lower status speakers. Speakers stop using the variant because of the stigma attached to it. Thus, among contemporary speakers, the r-0 variant could still index lower social status, although the usage of the variant has dropped to such an extent that its use no longer correlates with status. Of course, for this pattern to result in the observed loss of the r-0 variant across gender and social status among contemporary speakers, we must assume that r-0 did not become a marker of covert prestige, as might be hypothesized to occur with variables that assume a level of social stigma.

These possibilities, of course, are not mutually exclusive. The 35 years separating the two samples in the current analysis represent more than a full generation of language change. If the use of r-0 began to decrease among one generation of speakers because of the negative social associations of the variant, the frequency of the variant's use may have been sufficiently low that r-0 no longer indexes a lower status identity among contemporary speakers.

While no amount of contemporary data collection will allow us to determine the indexical meaning of (r)-use among the 1966 speakers, further data could at least identify whether the r-0 variant maintains a status-related meaning among contemporary speakers. Evaluational data, in the form of traditional language attitude assessments, could elicit this sort of variable-specific information. Further, performative data, as in speakers' performances of lower-status speech, may help to identify whether this variable is salient and stigmatized among contemporary Detroit speakers.

The discussion in this paper specifically considers the process by which a variable changes over time in both the level of use of its different variants and the social relationships of those variants. By combining both real-time analyses and information on the social embedding of variables within each recording period, I trace changes in the way groups of speakers use linguistic variables over time. This highlights the importance of examining language change as a phenomenon centered around speakers and groups of speakers, rather than as an abstract concept independent of speakers. For this reason, I suggest that combining analyses of social embedding with those of real-time changes will provide additional and invaluable information about the ways that linguistic changes are actually instantiated within speech communities.

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Department of Linguistics
University of Michigan
Ann Arbor, MI 48109
jgnguyen@umich.edu