# Center for Language Research

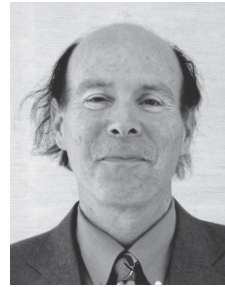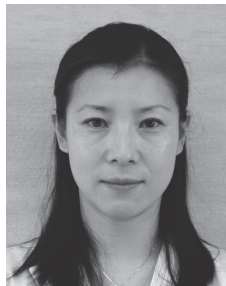| | | | |
|---|---|---|---|
| John Brine<br>Professor | Ian Wilson<br>Professor | William V. Rozycki<br>Professor | Debopriyo Roy<br>Senior Associate Professor |
| Emiko Kaneko<br>Senior Associate Professor | Naomi Ogasawara<br>Senior Associate Professor | Anna Danielewicz-Betz<br>Associate Professor | Heo Younghyon<br>Associate Professor |
| Jeremy Perkins<br>Associate Professor | Kim Forrester Rockell<br>Associate Professor | Takako Yasuta<br>Associate Professor | Gregory K. Iverson<br>Visiting Researcher |

The Center for Language Research (CLR), in the School of Computer Science and Engineering, was established in 1993 to contribute to the development

of professionals in computer science, computer engineering, and related fields through the research and teaching of successful language use in academic and workplace contexts – in particular, the use of English for academic and professional purposes. Faculty research focuses on language theory, use, pedagogy, and acquisition as well as on supporting educational technologies. Grounded in this research, CLR faculty provide innovative English language training to University of Aizu students at the graduate and undergraduate levels, as well as to university students and faculty at other universities around the world via keynote speeches, conference presentations, training seminars, and workshops. Researchers interested in applying for a position in the CLR or collaborating with CLR faculty on joint projects should contact the CLR Office at clr-office@u-aizu.ac.jp.

## Refereed Journal Papers

[naomi-o-01:2013] Wilson Ian Kaneko Emiko Ginsburg, Jason and Naomi Ogasawara. Phonetic Features of Interrogatives in Aizu Area Dialects. *Conference papers of the Dialectological Circle of Japan*, pages 9–16, 2013.

Conference paper

[naomi-o-02:2013] Wilson Ian Kaneko Emiko Ginsburg, Jason and Naomi Ogasawara. The relationship between intonation and final particles in the Aizu dialect. *Proceedings of the 147th Meeting of the Linguistic Society of Japan*, pages 154–159, 2013.

The Linguistic Society of Japan Proceedings

[rozycki-01:2013] W. Rozycki and N. Johnson. Non-canonical grammar usage in Best Paper award winners in engineering. *Journal of English for Specific Purposes*, pages 157–169, 2013.

Vol. 32

[wilson-01:2013] I. Wilson and B. Gick. Bilinguals use language-specific articulatory settings. *Journal of Speech, Language, and Hearing Research*, 57:361–373, 2014.

doi:10.1044/2013_JSLHR-S-12-0345. Previous work has shown that monolingual French and English speakers use distinct articulatory settings, the underlying articulatory posture of a language. The present study reports an experiment investigating articulatory settings in bilingual speakers. We first test the hypothesis that in order to sound native-like, bilinguals must use distinct language-specific articulatory settings in monolingual mode. Then, we test the hypothesis that in bilingual mode, a bilingual's articulatory setting is identical to the monolingual-mode setting of one of their languages. Eight French-English bilinguals each read 90 English and 90 French sentences, and their inter-speech posture (ISP) was measured using optical tracking of the lips/jaw and ultrasound imaging of the tongue. Results show that bilingual speakers who are perceived as native in both languages exhibit distinct language-specific ISPs, and those who are not perceived as native in one or more languages do not. In bilingual mode, bilinguals use an ISP that is equivalent to the monolingual-mode ISP of their currently most-used language. The most balanced bilingual used a French lip ISP but an English tongue-tip ISP. Results support the

claim that bilinguals who sound native in each of their languages have distinct articulatory settings for each language.

## Unrefereed Papers

[wilson-02:2013] N. Terunuma T. Sato S. Moriya, Y. Taguchi and I. Wilson. Normalization and matching routine for comparing first and second language tongue trajectories. *IEICE Technical Report*, 113(308):53–57, 2013.

The main purpose of this research is specifying the articulation difference between L1 and L2 speakers by digitizing tongue motions and analyzing their differences between utterances. Differences in tongue motion directly influence speakers' pronunciation, so it may be possible to determine a speaker's L1 from tongue motion data. By comparing L1 and L2 speakers' tongue motion, we can also guide L2 speakers to improve their L2 pronunciation. In this research, we use coronal cross sections of the tongue taken by an ultrasound scanner to carry out the following: first, record the ultrasound of a speaker's tongue motion using the story 'The Boy Who Cried Wolf.' Then, sample mobility information by using histogram of oriented gradients. Next, use Karhunen-Loeve expansion to reduce the vector dimensions. At this time, we get the average difference between the starting vector of tongue motion and the subsequent vectors, then normalize the direction of the two averages. Finally, we use dynamic time warping to compare each vector per frame. The experiment results allowed us to compare speakers' tongue mobility information in words which were recorded in different experimental environments or by different speakers.

## Refereed Proceeding Papers

[kaneko-01:2013] William Rozycky, Emiko Kaneko, and Anna Danielewicz-Betz. Oral Presentation at International Engineering Conferences: Effects of the Local on the Global. In *Proceeding of Professional Communication Conference*, pages 1–5, 2013.

Based on preliminary observation of international engineering conference presentations in East Asia and Europe, a comparative, two-stage

investigation of the effect of delivery style on audience comprehension was undertaken. The current paper reports on the first stage, which involves measuring presenter 's 1) bodily degree of orientation to audience and 2) proportion of spoken words that are additional to the printed slide text of the presentation. Data were gathered at two East Asian international engineering research conferences, and at two European venues of similar conferences. Findings indicate that there is no significant difference in body orientation to audience in any of the venues, but that European conferences produced more text per slide on average than the East Asian conferences. Words spoken extraneous to the slide text varied more between conferences on the same continent than the difference in averages for this value between continents. Results suggest that body orientation to audience is uniform, but considerable variation occurs among conferences and among presenters in regard to speech that is extraneous to the slide text. Index

[kaneko-02:2013] ジェイソン・ギンズバーグ、金子恵美子、イアン・ウィルソン、小笠原奈保美. 会津方言の疑問文に於けるイントネーションと終助詞の関係. In 日本言語学会第 *147* 回大会発表予稿集, pages 154–159, 2013.

本研究は、福島県の会津方言における疑問文の文末のイントネーションの変化を分析することを目的としている。会津方言話者からデータを収集し分析した結果、文末のイントネーションが下がる場合が多く、下降調の場合は上昇調の場合より終助詞を使う可能性が高いことが分かった。会津方言は消滅危機方言であり、言語学の立場からの会津方言の疑問文の研究は、私たちが知っている限り、行われたことがない。そのため、ギンズバーグら（２０１３）に続いて、本研究は会津方言の疑問文の実態を明らかにすることを目的としている。本研究では主に年配者（60 代〜90 代）の会津方言話者を対象に、発話を促すような構造的データ収集を行った。調査方法として、標準語や会津方言の単語を使った文章が書いてある紙を被験者に見せ、その文章を会津方言ならどのように言うかを尋ね、参加者の発話を録音した。４７名（平均年齢７４歳）のデータを収集し、その多くをデータベースに取り込んだ。データベースには各被験者の方言に影響を及ぼす可能性の高い情報（地域、年齢、性別）、被験者から収集された文章の書き起こしデータ、録音、録音のピッチトラック、文末のイントネーションの説明（イントネーションが下降調か上昇調か）が含まれている。また、データ分析のため、データベースから下降調と上昇調の比率等有効と思われる情報をプログラミング言語 Python を用いて抽出している。データベース（図１）は、すでにインターネッ

ト上で公開されている。

本論文の構成は以下の通りである。第２節では、疑問文の文末イントネーションの下降調データを紹介する。第３節では、疑問文の文末イントネーションと終助詞について考察する。最後に第４節で本論文の内容をまとめる。

[kaneko-03:2013] ジェイソン・ギンズバーグ、金子恵美子、イアン・ウィルソン. 会津方言の疑問文の音声特徴. In **日本方言研究会発表論文集**, pages 9–16, 2013.

本研究は福島県会津地方の方言で使われている疑問文を対象とし、その特徴を明らかにすることを目的としている。少子化や過疎化などの影響により会津方言の存続は危ぶまれている。その上、会津方言の疑問文の言語学的解析は、坂本 et al. (2010) などを除き、ほとんど行われたことがない。本稿では、会津方言の音声データの収集、分析の結果から、会津方言と標準日本語（東京方言）の疑問文のイントネーションとピッチピーク（文章のなかでピッチが最も高い部分）が異なることを示したい。他の方言の例に違わず、会津地方でも、若い世代が使用する会津方言の標準語化が進んでいる。客観的調査はしていないものの、その根拠として、１）年配の被験者が、孫は会津弁を話せないと証言していた、２）若い世代から対象となるデータを試験的に収集してみたところ、上の世代の会津弁のデータと明らかに異なっていた、といったことが挙げられる。そこで本研究では主に年配の会津方言話者（60 代〜90 代）を対象とした。　データ収集は以下のように行われた。標準語、もしくは会津方言の単語を使った文章が書いてある紙を参加者に見せ、その文章が会津方言ならどのように言うかを尋ね、参加者の返答を録音した。PRAATという音声解析のフリーソフトウェアで、収集した音声データから対象となる疑問文を抽出し、PRAAT　で表示されるピッチトラックを、日本語の同じようなピッチトラックと比較することで、会津弁の特徴を抽出した。現時点で 47 名（平均年齢７４歳）のデータを収集したが、本論文では、その一部のみを扱う。また、会津地方で使われている方言は地域によって異なる。おそらく、会津地方が広大で、山や川などの地形的理由で隔離されている部落や町が多いためであるが、本稿では、福島県会津若松市、猪苗代町、昭和村で話されている会津弁に限って議論する。本論文の構成は以下の通りである。まず、第２節では、標準日本語と会津方言の基本的なイントネーションとピッチの違いを紹介する。そして第３節で会津方言における子音の有声化による疑問文への影響について説明する。第４節で本論文の内容をまとめる。

[rozycki-02:2013] W. Rozycki, E. Kaneko, and A. Danielewicz-Betz. Oral presentation at international engineering conferences: Effect of

the local on the global. In *Proceedings of the 2013 IEEE IPCC Communicating Vision Conference, July 15th-17th, Vancouver, Canada*, pages 1–5, 2013.
ISBN: 978-1-4673-0010-7

[wilson-03:2013] I. Wilson and D. Erickson. Effect of syllable onset, coda, and nucleus on degree of skin stretching over the mandible. In *Proceedings of Meetings on Acoustics (POMA)*, pages 1–4, 2013. doi:10.1121/1.4799467. Movements of the mandible have been shown to correlate with English speech rhythm, and significant differences have been found between native speakers' mandible movements and those of second-language speakers. A simple, inexpensive method of inferring movements of the mandible is to use video tracking of a chin marker during speech. However, since the skin is free to stretch over the mandible, inferences using the chin marker may not always be accurate. This study examines the degree of skin stretching during vowel production in 18 different CVC syllables (using 3 different stop consonants and 2 different vowels) spoken as the middle word in a 3-word utterance. We made electromagnetic articulometer (EMA) recordings of two North American English speakers (1 male, 1 female). The distance was measured between coils placed on the lower incisor and on the skin of the mental protruberance (chin). For both speakers, the distance significantly differed depending on the vowel. The onset C affected the distance for only the female speaker. The coda C did not significantly affect the distance for either speaker. These results need to be taken into account as we continue to develop a method for video recording jaw displacement patterns in running speech.

[wilson-04:2013] E. Kaneko J. Ginsburg, I. Wilson and N. Ogasawara. The relationship between intonation and final particles in interrogatives in the Aizu dialect. In *Proceedings of the 147th meeting of the Lingusitic Society of Japan (LSJ)*, pages 154–159, 2013.
本研究は、福島県の会津方言に於ける疑問文の文末のイントネーションの変化と終助詞の関係を明確にすることを目的としている。会津弁話者からデータを収集し分析した結果、疑問文では文末になるにつれて上昇調の方が多かったが、すべてがそうとは限らず、下降調になる場合も少なくなかった。この点に関して、会津方言の疑問文は、基本的に上昇調になる標準日本語（木部 2010）と異なるように見える。文末のイントネーションが下がる場合、疑問終助詞を使うのが無標であることも明らかになった。これはおそらく肯定文（下降調）と区別するためである。また、

肯否疑問文より疑問詞疑問文の方が下降調になる傾向が見られる。本稿では、会津方言の疑問文のイントネーションの特徴やイントネーションと終助詞の関係をより詳しく説明し、考察する。

[wilson-05:2013] E. Kaneko J. Ginsburg, I. Wilson and N. Ogasawara. Phonetic features of interrogatives in Aizu area dialects. In *Proceedings of the 96th meeting of the Dialectological Circle of Japan*, pages 9–16, 2013.

本研究は福島県の会津地方の方言で使われている疑問文を対象とし、その特徴を明らかにすることを目的としている。少子化や過疎化などの影響により会津方言の存続は危ぶまれている。その上、会津方言の疑問文の言語学的解析は行われたことがない。収集した音声データの音声分析の結果から、会津方言と標準日本語（東京方言）の疑問文のイントネーションとピッチピークは異なることがわかった。本研究では、まず会津弁話者の会津弁データを録音した。標準語、もしくは会津方言の単語を使った疑問文が書いてある紙を参加者に見せ、その文を会津方言ならどのように言うかを尋ね、参加者の返答を録音した。現時点で 45 名のデータを収集し、それらを PRAAT という音声解析のフリーソフトウェアで分析した。本論文では、その一部を使った分析を述べたい。

[wilson-06:2013] M. Cohen J. Villegas, W.L. Martens and I. Wilson. Spatial separation decreases psychoacoustic roughness of high-frequency tones. In *Journal of the Acoustical Society of America*, volume 134, page 4228, 2013.

doi:10.1121/1.4831530. Perceived roughness reports were collected for pairings of sinusoidal tones presented either over loudspeakers or headphones such that the sounds were collocated or spatially separated 90 degrees in front of the listener (+/- 45 degrees). In the loudspeaker experiment, pairs of sinusoids were centered at 0.3, 1.0, and 3.3 kHz, and separated by half a critical band. In the headphone experiment, the pairs of sinusoids were centered at 0.5, 1.0, and 2.0 kHz, and separated by a semitone. Although not all listeners' reports showed the influence of spatial separation as clearly as others, analysis indicates that listeners generally found spatially separated tone combinations less rough when the frequencies of those tones were centered at 2.0 kHz or higher. This trend was also observed in a follow-up study with 20-component complex tones at fundamental frequencies of C2, C3, A4, and C4 (131, 262, 440, and 523 Hz, respectively) presented via headphones. These results suggest that spatial separation decreases perceived roughness,

especially for tones with frequencies higher than the threshold at which inter aural time differences rival inter aural level differences for sound localization (approximately 2.3 kHz) and that the current roughness models need to be reviewed to include binaural effects.

[wilson-07:2013] B. Gick S. Kanada, I. Wilson and D. Erickson. Coarticulatory effects of lateral tongue bracing in first and second language English speakers. In *Journal of the Acoustical Society of America*, volume 134, page 4244, 2013.

doi:10.1121/1.4831608. This study uses electromagnetic articulometry (EMA) to examine the coarticulatory effects of tongue bracing in L1 and L2 English speakers. The tongue is hydrostatic, so we brace it against our teeth for added control, and this bracing is an important part of pronunciation. The amount of bracing may differ across languages (and may be part of one's articulatory setting), so understanding these differences could be a key to L2 pronunciation learning. Although lingual coarticulation has been examined using acoustics and midsagittal views of the vocal tract, not much focus has been placed on the coronal view. We collected EMA point-tracking data from two native speakers of North American English and looked at the movement of a lateral tongue marker. As stimuli, we choose the nursery rhyme 'Mary had a Little Lamb' because of the variation in vowels, and also the /l/ and /r/ phonemes, which are absent in Japanese. Initial results show differences between vowels that occur next to /l/ and those that occur next to /r/ and stops. Results will also be presented for Japanese speakers of both their L1 (Japanese) and L2 English. If we find crosslinguistic differences in bracing, this fact will be important for pedagogical purposes.

[wilson-08:2013] I. Stavness B. Gick, B. Allen and I. Wilson. Speaking tongues are always braced. In *Journal of the Acoustical Society of America*, volume 134, page 4204, 2013.

doi:10.1121/1.4831431. Bracing the tongue against rigid vocal tract surfaces (i.e., teeth or palate) has been suggested to be important in facilitating certain kinds of tongue movements [Stone, M. 1990. JASA, 81:2207-2218]. However, previous studies have generally sought bracing in only a narrow range of phonetic contexts, resulting in a widespread view of bracing as an occasional state, peculiar to specific sounds or sound combinations. The present study uses electropalatography (EPG) as well as ultrasound imaging and electromagnetic articulometry (EMA) to describe tongue bracing in continuous speech

passages, finding that the tongue is almost constantly braced against lateral surfaces during running speech. Analysis of archival data from the male and female speakers of American English in the KayPENTAX Palatometer Database (Model 4333) shows that they brace the tongue continuously, except during a small percentage of low vowels, and during a larger percentage of instances of /l/. Additional measures using all three devices, as well as biomechanical simulations using ArtiSynth (www.artisynth.org), provide further insight, indicating that the tongue also braces against the central palate and/or lower jaw, and that bracing points slide anteroposteriorly across speech sounds. These results suggest that bracing is a constant and necessary aspect of tongue motor control.

[wilson-09:2013] N. Terunuma S. Moriya, Y. Yaguchi and I. Wilson. Normalization and matching routine for comparing first and second language tongue trajectories. In *Journal of the Acoustical Society of America*, volume 134, page 4244, 2013.

doi:10.1121/1.4831607. The main purpose of this research is specifying the articulation difference between L1 and L2 speakers by digitizing tongue motions and analyzing their differences between utterances. Differences in tongue motion directly influence speakers' pronunciation, so it may be possible to determine a speaker's L1 from tongue motion data. By comparing L1 and L2 speakers' tongue motion, we can also guide L2 speakers to improve their L2 pronunciation. In this research, we use coronal cross sections of the tongue taken by an ultrasound scanner to carry out the following: first, record the ultrasound of a speaker's tongue motion using the story 'The Boy Who Cried Wolf.' Then, sample mobility information by using histogram of oriented gradients. Next, use Karhunen-Loeve expansion to reduce the vector dimensions. At this time, we get the average difference between the starting vector of tongue motion and the subsequent vectors, then normalize the direction of the two averages. Finally, we use dynamic time warping to compare each vector per frame. The experiment results allowed us to compare speakers' tongue mobility information in words which were recorded in different experimental environments or by different speakers.

[youngheo-01:2013] Younghyon Heo and Hyowon Song. The Effect of Familiarity between Partners on EFL Oral Performance. In *Applied Linguistics in Asia: Global and Local Perspectives*, pages 360–362, 2013.

This paper explores the effect of the familiarity between partners on their performance during oral proficiency tests in an EFL class. It was shown that if test-takers are familiar with each other, it leads to positive results in their test performance for more complex L2 tasks while it may not have much impact on simple tasks.

## Books

[rozycki-03:2013] K. Namai, K. Kikuchi, W. Rozycki, and M. Shimura. *Discovery: English Communication II*. Kairyudo, 2013.
Textbook in use in Japanese high schools

## Chapters in Book

[rozycki-04:2013] U. Connor and W. Rozyck. *ESP and Intercultural Rhetoric (Blackwell Handbook of ESP)*, pages 427–444. Blackwell Handbooks of Linguistics. Blackwell, 2013.

## Grants

[kaneko-04:2013] Emiko Kaneko. シャド-イングと誘出模倣のＬ２自発発話に対する影響の比較, 2013-2015.

[kaneko-05:2013] 金子恵美子、イアン・ウィルソン、小笠原奈緒美、ホウ・ヨンヒョン、ジェレミー・パーキンズ. 会津地方の方言の不思議：発音と認識の関係の調査事業, 2013.

[kaneko-06:2013] Yukio Tono et al. 学習者コーパスによる英語ＣＥＦＲレベル基準特性の特定と活用に関する総合的研究, 2012-2015.

[naomi-o-03:2013] Naomi Ogasawara (PI). Classification and linguistic analysis of natural disaster evacuation calls, 2014-2017.
Anna, D-B, Younghyon Heo, Jason Ginsburg, Katsuko Kuwada are co-investigators.

[wilson-10:2013] I. Wilson. JSPS Grant-in-Aid for Scientific Research (Acad. Research Subsidies) KAKENHI 23520467, 2011-2014.

[wilson-11:2013] I. Wilson. University of Aizu Competitive Research Funding, 2013.

[youngheo-02:2013] Younghyon Heo. KAKENHI: Improving English Listening and Reading Comprehension via Using Visuals, 2013-2014.

## Academic Activities

[kaneko-07:2013] Emiko Kaneko, 2013.

研究会運営委員会委員、JLTA Journal 査読委員

[naomi-o-04:2013] Kaneko Emiko Ogasawara Naomi Ginsburg, Jason and Ian Wilson, 1 2013.

"Intonation of wh-questions in the Aizu dialect" Poster presentation

[naomi-o-05:2013] Kaneko Emiko Ogasawara Naomi Ginsburg, Jason and Ian Wilson, 10 2012.

"Intonation used to contrast interrogative sentences in the Inawashiro dialect of the Aizu region" This is co-authored work, but I didn't attend this event.

[naomi-o-06:2013] Kaneko Emiko Ogasawara Naomi Ginsburg, Jason and Ian Wilson, 5 2013.

"Phonetic features of Interrogatives in Aizu Area Dialects" This is co-authored work, but I didn't attend this event.

[naomi-o-07:2013] Timothy Naomi Ogasawara, Vance and Chia-Lin Shih, 12 2013.

"Prosodic characteristics in Japanese speech by Taiwan Mandarin speakers and native Japanese speakers." Poster presentation

[naomi-o-08:2013] Kaneko Emiko Ogasawara Naomi Ginsburg, Jason and Ian Wilson, 11 2013.

"The relationship between intonation and final particles in the Aizu dialect" This is co-authored work, but I didn't attend this event.

[wilson-12:2013] N. Ogasawara E. Kaneko, I. Wilson and Y. Heo, December 2013.

Refereed Presentation, Differentiation of Yes/No and Wh-questions in the Aizu dialects. At the 3rd International Conference on Phonetics and Phonology (3rd ICPP), Tokyo, Japan.

[wilson-13:2013] J. Villegas I. Wilson and T. Doi, November 2013.

Unrefereed Presentation, Lateral tongue bracing in Japanese and English. At Ultrafest VI, a biennial conference for speech researchers who are using ultrasound, Edinburgh, Scotland.

[wilson-14:2013] I. Wilson, June 2013.

> Invited Keynote Lecture, Pronunciation and Professional Communication. At the 1st Technical Meeting of 2013, Tokyo, Japan.

[wilson-15:2013] I. Wilson, July 2013.

> Reviewer, Journal of Speech, Language and Hearing Research.

## Ph.D and Others Theses

[rozycki-05:2013] M. Namiki. Development of a Web-accessible database of Intensive English Programs in the US, University of Aizu, 2013.

> Graduation thesis

[wilson-16:2013] Milica Radisic. PhD Thesis: An ultrasound and acoustic study of Turkish rounded/unrounded vowel pairs, University of Toronto - Department of Linguistics, March 2014.

> Thesis Advisor: Keren Rice, External Appraiser: I. Wilson

[wilson-17:2013] Sunao Kanada. Graduation Thesis: Lateral tongue rest position of L1 and L2 English speakers, School of Computer Science and Engineering, March 2014.

> Thesis Advisor: I. Wilson, Referee: Prof. Y. Yaguchi

## Others

[jperkins-01:2013] Jeremy Perkins. Distinct Lexical Strata in Thai consonant-tone interaction. Refereed Presentation at the International Conference on Phonetics and Phonology, Tokyo, Japan, December 2013.

Centers