[2013]応用知覚科学研究センター活動報告 : 平成25年度（2013年度）

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平成25年度（2013年度）活動報告

Annual Report 2013-2014

平成 26 年（2014 年）7 月

July 2014

九州大学 大学院芸術工学研究院
応用知覚科学研究センター

Research Center for Applied Perceptual Science
Faculty of Design, Kyushu University

平成25年度（2013年度）活動報告

Annual Report 2013-2014

ReCAPS

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1　ごあいさつ Greetings

We aim at establishing a new research area, perceptual science. Perceptual research has often been performed as a part of different disciplines, mainly psychology, physiology, and informatics. All these disciplines will be connected closely to each other in the new interdisciplinary area.

It is of vital importance to understand how humans gather and structuralize information related to the interaction between environments and humans; humans need a lot of information in order to adapt to environments. Each of our members is expected to cultivate new research fields when necessity arises, which will enable very efficient interdisciplinary cooperation. With “perception” as its main keyword, the Research Center for Applied Perceptual Science (ReCAPS) organizes researchers who each cover more than one specialized field. They are supposed to perform perceptual research keeping the viewpoints of different fields: perceptual psychology, cognitive science, brain science, signal processing, mathematical science, informatics, etc.

We will promote the idea that sharing frontiers between different academic areas creates new collaboration and new frontiers. This will be our strong message to the present world, with a great diversity of values. The new research system will influence our graduate students. They will be encouraged to obtain and cumulate knowledge from different research fields.

We invite everyone who is interested in enjoying science with us. We can perform experiments, organize seminars, write papers, and drink (or eat) together!

Yoshitaka NAKAJIMA, PhD

注：当センターでは，学術上の公用語として英語を用いております。本報告は九州大学内での報告を主たる目的として作成したため，目次等は日本語でも記述しております。

2 構成員リスト Members

2013 年（平成 25 年）10 月 1 日現在

2.1 知覚脳科学グループ Perceptual and Brain-Scientific Research Group

中島 祥好 #，センター長	主幹教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
伊藤 裕之 #	教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
須長 正治	准教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
大井 尚行	准教授	九州大学 大学院芸術工学研究院 環境デザイン部門
山下 友子	助教	九州大学 大学院芸術工学研究院 デザイン人間科学部門
飛松 省三*	教授	九州大学 大学院医学研究院 基礎医学部門

注：# は運営委員，*は協力研究員。

Yoshitaka NAKAJIMA#, PhD, Director	Distinguished Professor	Faculty of Design
Hiroyuki ITO#, PhD	Professor	Faculty of Design
Shoji SUNAGA, D. Eng.	Associate Professor	Faculty of Design
Naoyuki OI, D. Eng.	Associate Professor	Faculty of Design
Yuko YAMASHITA, PhD	Assistant Professor	Faculty of Design
Shozo TOBIMATSU*, MD, PhD	Professor	Faculty of Medical Sciences

Note: A hash mark indicates a steering committee member, and an asterisk an associate member.

2.2 応用知覚学グループ Applied Perceptual Research Group

坂田 年男 #	教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
高木 英行	教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
上田 和夫 #	准教授	九州大学 大学院芸術工学研究院 デザイン人間科学部門
鏑木 時彦	准教授	九州大学 大学院芸術工学研究院 コミュニケーションデザイン科学部門
上岡 玲子	准教授	九州大学 大学院芸術工学研究院 コンテンツ・クリエーティブデザイン部門
妹尾 武治*	准教授	九州大学 高等研究院
志堂寺 和則*	教授	九州大学 大学院システム情報科学研究院 情報学部門
光藤 宏行*	准教授	九州大学 大学院人間環境学研究院 人間科学部門

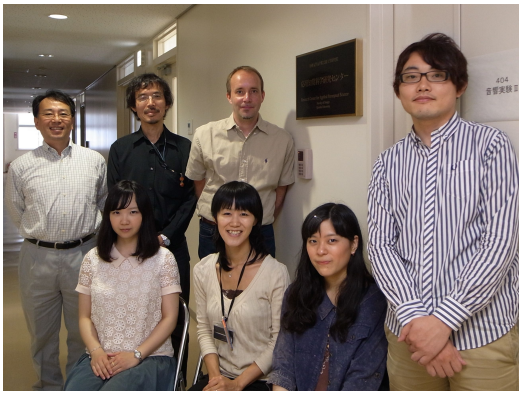
注：# は運営委員，*は協力研究員。

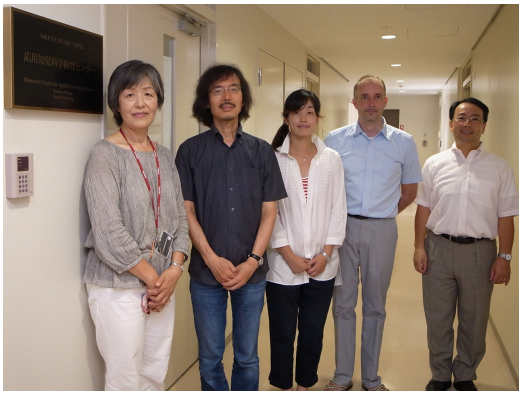
Toshio SAKATA#, PhD	Professor	Faculty of Design
Hideyuki TAKAGI, D. Eng.	Professor	Faculty of Design
Kazuo UEDA#, PhD	Associate Professor	Faculty of Design
Tokihiko KABURAGI, PhD	Associate Professor	Faculty of Design
Ryoko UEOKA, PhD	Associate Professor	Faculty of Design
Takeharu SENO*, PhD	Associate Professor	Institute for Advanced Study
Kazunori SHIDOJI*, PhD	Professor	Faculty of Information Science and Electrical Engineering
Hiroyuki MITSUDO*, PhD	Associate Professor	Faculty of Human-Environment Studies

Note: A hash mark indicates a steering committee member, and an asterisk an associate member.

2.3 事務補佐員 Secretary

黒田沙恵［2013 年（平成 25 年）5-11 月］ Sae KURODA (from May 2013 to November 2013)
直井雅子［2013 年（平成 25 年）12 月より］ Masako NAOI (from December 2013)





3 本年度の活動実績 Activities

3.1 設立記念シンポジウム：Between Perception and Language (知覚と言語のあいだで)

Date and time: 1 April 2013, 13:30-18:30

Venue: Room 322 of Building 3, Ohashi Campus, Kyushu University

Program

13:30 *Greeting*
Yoshitaka NAKAJIMA
Department of Human Science/Director of ReCAPS, Faculty of Design, Kyushu University

13:35 *Opening address*
Shinichi ISHIMURA
Dean, Faculty of Design, Kyushu University

13:45 *Keynote lecture*
Poetry and silence
Eishu SONOI
Professor Emeritus, Kyushu University

A poem is ordinarily composed of words, sounds, rhythm and metre. Silence, the unspoken blanks within or after the lines, however, involves as much significance as sounds and meanings of poems. This lecture will look into the nature of silence in poetry in some of the English and the Japanese examples.

14:15-14:30 Break

14:30 The expert on language learning: Infant speech development for the first two years of life
Yuko YAMASHITA
Graduate School of Design, Kyushu University

During the first 2 years of age, infant vocalization changes from cooing to babbling, and then to words similar to adult speech. This talk reviews recent research on infant speech development.

14:45 Morphologic and kinematic observation of speech articulators
Tokihiko KABURAGI
Department of Communication Design Science/ReCAPS, Faculty of Design, Kyushu University

Movements of the articulatory organs form the configuration of the vocal tract and determine acoustic property of speech such as formants. Methods are presented in the talk for enabling kinematic and morphologic observation of hidden, invisible state of the articulatory organs during the production of speech.

15:00 *Invited lecture*
Infant vocal behaviors when playing alone
Yohko M. SHIMADA
Center for Baby Science, Doshisha University

Five-month-old infants' motivation for vocalization in the absence of others was investigated. Three experimental conditions were conducted: responded by the mother, alone without response, and no response with amplified feedback. Results suggested that the infants prolonged their sounds when they received amplified feedback, and they repeated the same phrases more frequently when alone as they were singings in a primitive way.

15:20-15:40 Break

15:40 Cortical processing of whispered speech

Gerard B. REMIJN
International Education Center, Kyushu University

Whisper is a deliberately degraded speech signal that is produced without vocal fold vibration. Acoustic differences between whisper and normally-vocalized speech mainly concern intensity, syllable duration, and fundamental frequency. Because whisper is commonly used in highly personalized communication, understanding of whisper not only requires accurate processing of the signal's degraded acoustic properties, but also "mind reading" of the speaker's confidentiality. Here we present four experiments on the cortical processing of whispered spoken words. Two experiments were performed with near-infrared spectroscopy, in which cortical hemodynamic responses were obtained of adults, typically-developing preschool children, and autistic preschool children while they listened to whispered word associations. In the other two experiments, event-related potentials were obtained of adults listening to whispered words and syllables. The combined results seem to indicate that processing of whisper mainly implicates the right temporal cortex, with involvement of bilateral frontal areas depending on stimulus content and research paradigm.

15:55 Interactive evolutionary computation as a tool for human science

Hideyuki TAKAGI
Department of Human Science/ReCAPS, Faculty of Design, Kyushu University

Interactive evolutionary computation (IEC) is a technique for optimizing a target system based on human subjective evaluations. Fitting a hearing-aid based on user's hearing, for example, is a typical application. Since the target system is optimized based on an IEC user's psychological scale, we may be able to analyze the human characteristics indirectly by analyzing the target system, i.e., we may be able to use the IEC as a tool for analyzing human characteristics. We introduce this new direction of IEC research.

16:10 *Invited lecture*

Evolution of the analysis of brain signal

Fumikazu MIWAKEICHI
Department of Statistical Modeling, Institute of Statistical Mathematics

Various techniques have been proposed to record neural activity in the brain, such as electroencephalography (EEG), functional magnetic resonance imaging (fMRI), optical imaging (OI) and so on. In order to extract spatio-temporal pattern of neural activity and connectivity between regions, regression analysis and cross correlation analysis have been widely used. These approaches evaluate resemblance of temporal pattern between time series corresponding to a channel/pixel/voxel and a preliminarily assumed reference function, which reflects temporal changes

in neural activation. Another approach is based on statistical time series, such as autoregressive (AR) type model, which was proposed in our previous research. This approach enables us to extract brain neural activation as a phase transition of dynamics in the system without employing external information such as the reference function. I will overview typical brain signal data and methodological approaches for the data analysis in this talk.

16:30-17:00 Break (to take group photos)

17:00 Modulation of vection by sound

Takeharu SENO
Institute for Advanced Study/ReCAPS, Kyushu University

Visually induced self-motion perception (vection) could be modulated by sound. In this talk three examples will be introduced. The positive sound i.e. the sound of baby laughing could facilitate upward vection. The ascending and descending pitches enhanced vertical vection. The music could enhance forward vection.

17:15 *Keynote lecture*

How many words are needed to be a competent user of English?

David HIRSH
Faculty of Education and Social Work, University of Sydney

We know approximately how many words there are in the English language. We also know how many of these words competent native speakers know. In addition, we can calculate the vocabulary size a language user requires in order to understand and produce language in a range of spoken and written contexts. This seminar paper will provide an overview of the current understandings and methodologies in the area of second language vocabulary studies to provide a basis for quantifying *language competence* and thus estimating the number of words a language user requires to achieve a level of competence in their use of the English language.

17:45-17:55 Short break

17:55 *Keynote lecture*

Intuition, logic, and scientific experiment

Takashi YANAGAWA
Biostatistics Center, Kurume University/Professor Emeritus, Kyushu Univeristy

Medical science, and perceptual science likewise, is concerned with human beings. Not to mention, but human beings are all different in their background such as medical history, genetic and environmental factors. The difference may easily distort the reproducibility and universality of your research findings and thus come to nothing your effort and resources. Carefully designed (human) experiment that controls the influence of those background factors is essential to establish scientific evidence from the findings. I will introduce you in this talk our experience at the Biostatistics Center, Kurume University, for establishing scientific evidence in medical science according to the following outline.

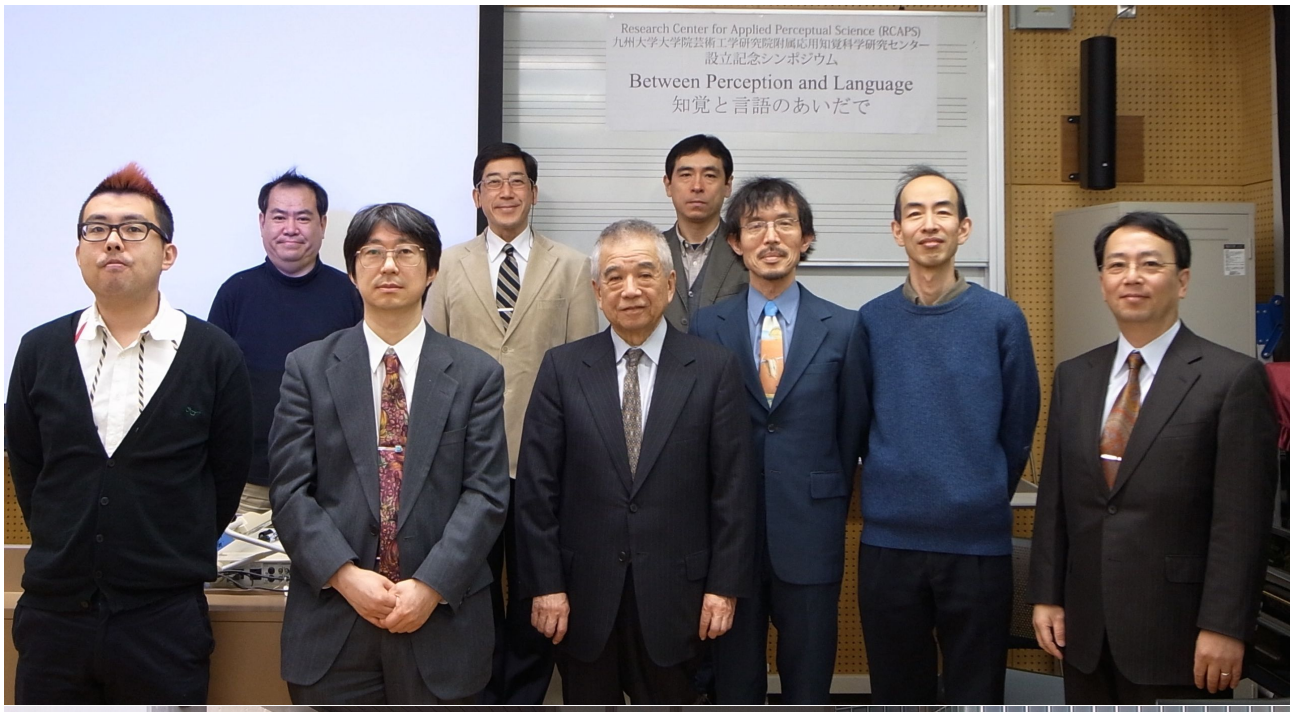
1. Medical doctors have medical hypothesis intuitively obtained through their daily practice. The first step is to quantify their medical hypothesis and change it to a statistical hypothesis. Asking what are feasible measurements, we must establish the principle endpoint and

secondly endpoint. Asking what are confounding factors involved in the study, we must identify them and assess their impact. Much logical thinking is needed in this stage.

2. In the designing stage of (human) experiment, two groups, the study group and control group, must be established randomly. Use stratified randomization to control the impact of strong confounding factors at the designing stage. The randomization introduces the comparability of the two groups and thus validates the reproducibility of the findings. It also provides the justification of any statistical analysis.

18:25 *Closing remarks*

Toshio SAKATA
Department of Human Science/ReCAPS, Faculty of Design, Kyushu University



3.2 The 6th Perceptual Frontier Seminar

Date and time: 16 May 2013, 17:00-18:30

Venue: Seminar Room A, 7 Floor, Building 5, Ohashi Campus, Kyushu University

Coordinator: Hideyuki TAKAGI (Faculty of Design/ReCAPS, Kyushu University)

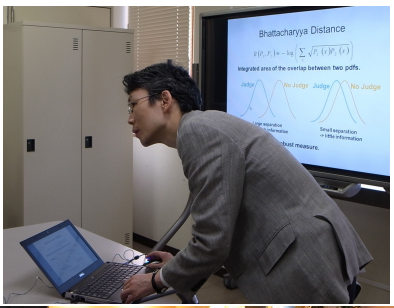
Program

17:00 Wearable computer: Human centered information technology toward human understanding
Ryoko UEOKA*
*Faculty of Design, Kyushu University

A wearable computer may contribute to deepen our understanding on human nature, because such a computer will inevitably get involved in our daily life. The concept of the wearable computer will be introduced, and a pilot work utilizing the technology in a perceptual experiment will be presented.

18:00 A reanalysis of magnetoencephalograms associated with time perception using Bhattacharyya distance
Hiroshige TAKEICHI*, Yoshitaka NAKAJIMA**, Takako MITSUDO**, and Shozo TOBIMATSU**
*RIKEN, **Kyushu University

We reanalyzed Mitsudo et al.'s (2012) magnetoencephalogram (MEG) data to extract brain activity associated with time perception. MEGs obtained when participants made temporal judgments for simple stimuli were compared with MEGs obtained when the participants passively listened to the stimuli using Bhattacharyya distance. As a result, the difference started to increase at the beginning of the stimulus, suggesting an on-line process for time perception.



3.3 The 7th Perceptual Frontier Seminar

Date and time: 26 July 2013, 17:00-19:00

Venue: Ohashi Satellite, Ohashi Campus, Kyushu University (at the southwest cornar of the east-side intersection of Nishitetsu Ohashi Station)

Organizer: Takeharu SENO (Institute for Advanced Study/ReCAPS, Kyushu University)

Program

Talk 1: Computation and cognitive processing of subjective color illusion
Haruaki FUKUDA*
*Department of General System Studies, the University of Tokyo

Color perception can arise subjectively even from the objectively achromatic stimuli, and this effect have been called subjective color illusion. We can consider these colors as the results from purely our neural and cognitive processing. In this presentation, we will discuss the cognitive mechanisms of color perception with some experimental results about subjective color.

Talk 2: Cross-cultural differences in unconscious knowledge
Sachiko KIYOKAWA*
*Graduate School of Education and Human Development, Nagoya University

Previous studies have indicated cross-cultural differences in conscious processes, such that Asians have a global preference and Westerners a more analytical one. We investigated whether these biases also apply to unconscious knowledge. In my talk, I will report four experiments examining how cultural biases affect the type of unconscious knowledge people acquire.

Talk 3: A reinterpretation of the reanalysis of electroencephalograms associated with time perception using Bhattacharyya distance
Hiroshige TAKEICHI*, Yoshitaka NAKAJIMA**, Takako MITSUDO**, and Shozo TOBIMATSU**
*RIKEN, **Kyushu University

Previously, we reanalyzed Mitsudo et al.'s (2012) electroencephalogram (EEG) data to extract brain activity associated with time perception. EEGs obtained when participants made temporal judgments for simple stimuli were compared with EEGs obtained when the participants passively listened to the stimuli using Bhattacharyya distance. As a result, the difference started to increase at the beginning of the stimulus. Here, in order to confirm the validity of the observation above, we made a "mosaic" data set by swapping a half of the data between the two conditions and calculated Bhattacharyya distance in the same manner, expecting that a different pattern of results was to be obtained. Quite surprisingly, the same pattern of the results was obtained. Thus our previous results failed to "pass the mosaic test", requiring a reinterpretation of the results. The rise of the Bhattacharyya distance seems to reflect increase in the individual difference in response to the stimulus as well as increase due to the conditional difference.

3.4 The 8th Perceptual Frontier Seminar: Symposium on Vection

Date and time: 6 August 2013, 17:00-19:00

Venue: Room 524, Building 5, Ohashi Campus, Kyushu University

Organizer: Takeharu SENO (Institute for Advanced Study/ReCAPS, Kyushu University)

Program

Talk 1: Introduction to vection

Takeharu SENO*

*Institute for Advanced Study/ReCAPS, Kyushu University

Coherent motion over a large area of the visual field induces an observer's self-motion perception, i.e. vection. I will present a basic introduction to vection research, providing a brief review of previous vection investigations. The talk will focus on their measuring methods and stimulus conditions.

Talk 2: Perceptual mechanism underlying jitter/oscillation effect in visually induced self-motion perception (vection)

Shinji NAKAMURA*

*Faculty of Social and Information Sciences, Nihon Fukushi University

It has been widely known that optic flow pattern which contains additional accelerating components (e.g. simulated viewpoint jitter or oscillation) can induce stronger forward vection than pure radial expansion. The jitter/oscillation effect has attracted vection researcher's attention, because it cannot be consistently understood using traditional assumption that vection would be strengthened when visual and vestibular information concerning self-motion are in concordance with each other. In my talk, our recent experiments concerning the effects of additional jitter/oscillation on vection are reviewed in order to propose tentative hypothesis that can potentially accounts for the jitter/oscillation effects.

Talk 3: Influences of spatial layout on the perception of self-motion

Robert ALLISON*

*Department of Computer Science and Engineering/Centre for Vision Research, York University

Compelling experiences of self-motion, known as vection, can be produced in a stationary observer by visual stimulation alone. Normally this visual stimulation takes place in the context of the 3D layout of the environment and the omnipresent force of gravity. In this talk I will discuss our experiments investigating the role of spatial orientation and the perception of layout in the production of vection.

3.5 The 9th Perceptual Frontier Seminar: Cross-Cultural Studies of Auditory Perception

Date and time: 13 August 2013, 16:00-18:00

Venue: Room 601, Building 3, Ohashi Campus, Kyushu University

Coordinator: Yoshitaka NAKAJIMA (Department of Human Science/ReCAPS, Kyushu University)

Presenters: Cong JIANG (Capital Normal University, Beijing, China), Tsuyoshi KURODA (Graduate School of Medical Sciences, Kyushu University), and Emi HASUO (Graduate School of Medical Sciences, Kyushu University)

Three young researchers, who have had chances to investigate influences of different cultures on auditory perception, will present their findings and new questions. Cong Jiang will talk about tonality perception in music. Tsuyoshi Kuroda will report a study on the perception of rhythm patterns extracted from different languages. Emi Hasuo will present a new question on a potential cultural difference in time perception.

3.6 The 22nd Virtual Reality Psychology International Conference

Date and time: 12 October 2013, 13:00-18:00

Venue: Room 511, Ohashi Campus, Kyushu University

Cosponsored by Technical Committee of Virtual Reality Psychology, the Virtual Reality Society of Japan, and Research Center for Applied Perceptual Science, Kyushu University.

Program

Opening remarks (13:00-13:10) Yoshitaka NAKAJIMA (Kyushu University)

Session 1 (13:10-14:25)

1. Stimulus meaning alters vection strength
   Takeharu SENO (Kyushu University)
2. Two successive dots in downward direction increase perceived duration
   Tsuyoshi KURODA (Research Fellow of JSPS / Kyushu University), Simon GRONDIN (Laval University), Katsuya OGATA, and Shozo TOBIMATSU (Kyushu University)
3. ERP investigation on intra- vs. inter-modal duration discrimination
   Emi HASUO (Kyushu University), Emilie GONTIER (Universite Laval), Takako MITSUDO (Kyushu University), and Simon GRONDIN (Universite Laval)
4. The contribution of the vibrotactile stimulation to our self-body position perception: The mirror illusion study
   Daisuke TAJIMA (Tokyo Institute of Technology), Tota MIZUNO (The University of Electro-Communications), Yuichiro KUME (Tokyo Polytechnic University), and Takako YOSHIDA (Tokyo Institute of Technology)
5. The critical visual feedback delay to turn our self-body sensations into others: The hand and eye movement study
   Seiya KAMIYA and Takako YOSHIDA (Tokyo Institute of Technology)

Session 2 (14:35-15:35)

6. Distortion of auditory space during visually induced self-motion perception
   Wataru TERAMOTO, Kazuki MOISHI (Muroran Institute of Technology), ZHENGLIE Cui, Shuichi SAKAMOTO, and Jiro GYOBA (Tohoku University)
7. Temporal periodicity with Japanese- and English-learning infants
   Yuko YAMASHITA, Yoshitaka NAKAJIMA, Kazuo UEDA, Takeharu SENO (Kyushu University), Yohko M. SHIMADA (Doshisha University), and David HIRSH (University of Sydney)
8. Perceptual roles of power-fluctuation factors of speech sound revealed by cepstral liftering and zero-shifted factor analysis
   Takuya KISHIDA, Yoshitaka NAKAJIMA, Kazuo UEDA, Gerard B. REMIJN, and Takuya FUJIOKA (Kyushu University)
9. Forecasting and analysis of social psychology using WOM: Case of art management
   Yasuko KAWAHATA and Etsuo GENDA (Kyushu University)

Mini International Symposium on Vection (16:00-18:00)

10. Opening remarks and an introduction to vection
Takeharu Seno (Kyushu University)

11. Self-motion perception by wind
Kayoko MURATA, Masami ISHIHARA, and Shigeru ICHIHARA (Tokyo Metropolitan University)

We examined whether a feeling of self-motion would occur when feeling wind on the skin accompanied by vestibular motion. Participants perceived the strongest self-motion in the vestibular motion and wind condition. Wind from the front induced stronger self-motion than other directions. We divided the face into upwards and downwards from the center of the maxillary division. We compared the upper part with the lower. When the upper part of the face was masked, all indexes indicated a decrease in self-motion. Therefore, this result suggests that the upper part and lower part of the face might use different information processing systems.

12. Examining the cause of inverted vection using expanding/contracting random-dot patterns
Yasuhiko SAITO and Kenzo SAKURAI (Tohoku Gakuin University)

The "inverted vection" is self-motion perception in the same direction as a foreground motion induced by the slowly translating foreground with an orthogonally moving background (Nakamura & Shimojo, 2000). We extended their study to (1) investigate whether the inverted vection in depth occurs or not, and to (2) reexamine their claim that the mis-registration of eye movement by suppression of optokinetic nystagmus (OKN) induced by the foreground pattern causes the inverted vection (Nakamura & Shimojo, 2003). For these purposes, a non-translational expanding/contracting visual stimulus pattern as a foreground was used to prevent the translational OKN in Experiment 1 and 2. And also another non-translational rotating visual pattern was used as a background to eliminate the all possible translational OKN in Experiment 2. In Experiment 1, observers wore a shutter goggle for stereoscopic vision, and viewed stimuli on a screen in 120 cm viewing distance. A fixation cross was always presented in the center of screen surface. The background pattern was perceived to be 15 cm farther than the screen with rightward translating random-dot sat a constant speed of 25 deg/s. The foreground pattern was perceived to be 15 cm nearer than the screen with expanding/contracting random-dots at 5 constant accelerations (0.056, 0.223, 0.893, 3.571, 14.286 deg/sec2). Both foreground and background patterns were presented in the experimental condition. Only the foreground pattern was presented in the control condition. Observers performed key-press to report their perceived forward/backward self-motion, and the reported direction and duration of self-motion were recorded. In experimental condition, observers reported inverted vection when the foreground random-dots expanded/contracted slowly, and they reported ordinary vection when the random-dots expanded/contracted fast. In control condition, the duration of the self-motion sensation varied linearly with the speed of stimulus motion. The faster motion induced the stronger self-motion sensation in the direction opposite to the pattern motion. In Experiment 2, methods were the same as in Experiment 1 except that a rotating clockwise/counter-clockwise random-dot pattern was used as the background at a constant angular velocity (25 deg/s). Observers perceived the inverted vection when

the foreground pattern expanded/contracted slowly in experimental condition while they reported the ordinary vection in control condition as same as the results of Experiment 1. We conclude that (1) the inverted vection in depth occurs, and (2) there must be some factor for the inverted vection in depth other than the mis-registration of eye movement by suppression of translation OKN.

13. *Invited Talk:* Using virtual reality to study multi-modal and higher-level contributions to selfmotion illusions ("vection")
Bernhard RIECKE (Simon Fraser University Surrey)
There is a long tradition of investigating self-motion illusions induced by rotating or translating visual stimuli ("circular/linear vection"). Other modalities can also induce vection or contribute to visually induced vection, but have received considerably less attention in the literature. Here, I will focus specifically on non-visual and multi-modal contributions and interactions to vection. A part from vection being arguably one of the most compelling and embodied illusions, vection is also interesting from a fundamental research perspective, in particular in the context of investigating cue integration: In a vection-inducing situation, there is always a (more or less noticeably) cue conflict between some cues indicating self-motion (e.g., a moving visual or auditory stimulus) while others indicate stationarity or a lack of acceleration (e.g., tactile, kinesthetic, and vestibular cues from sitting on a stationary chair). From a more applied perspective, we are investigating how self-motion illusions could be utilized to improve self-motion simulations and human performance in virtual environments, in an attempt to reduce the need for costly physical motion of the observer.

14. *Invited Talk:* Inducing visual illusions of self-motion: Stimulus determinants and observer contributions
Stephen PALMISANO (University of Wollongong)
Vection is a term typically used to refer to visually induced illusions of self-motion. Over the years my colleagues and I have shown that many previously overlooked visual consequences of self-motion—stereoscopic motion, local changes in optical size, viewpoint jitter/oscillation and eye-movements—all play important roles in vection. These findings disprove long held assumptions that: (i) visual self-motion perception is based solely on the optic flow presented to a single eye; (ii) dot motion displays convey all of the important visual information for self-motion; and (iii) visually simulated self-acceleration prevents/destroys vection. Recently, we have also examined how vection is altered by eye-movements. For example, we have shown that superimposing a laterally moving fixation point onto a radial optic flow display can dramatically enhance the experience of vection in depth. Such findings suggest that common pursuit eye-movement errors play important roles in vection induction. In fact, in some situations, eye-movement patterns might even serve as objective indicators of vection.

3.7 The 10th Perceptual Frontier Seminar: Rhythm Perception with Mark Elliott

Date and time: 28 November 2013, 18:00-20:00

Venue: Room 601, Building 3, Ohashi Campus, Kyushu University

Program

Talk 1: Golden section effects in visual cognition: A signature for complex-system organization?

Mark A. ELLIOTT*, Joy KELLY*, Jonas FRIEDEL**, Jennifer BRODSKY***, and Paul MULCAHY*

*School of Psychology, NUI Galway, Galway, Republic of Ireland

**Department of Psychology, University of Salzburg, Austria

***Department of Psychology, Union College NY, USA

Search reaction times (RTs) are slower to target sections of a multi-sectioned display when the ratio between larger to smaller sections is equivalent to 1.61803. Using a visual-search task we sought to establish whether this effect was due to the spatial frequency structure of the displays. We added visual noise to each display matrix which had the statistical effect of convoluting the existing spatial frequency structure with a uniform distribution, and reduced RTs consistent with our expectations.

Other talkers: Yuko YAMASHITA, Emi HASUO, and Zhimin BAO

3.8 九州大学「文理融合型の知覚・認知研究拠点」2013 年忘年ポスター・シンポジウム

日時： 2013 年 12 月 2 日（月）17:00-19:00

会場： 九州大学総合研究棟（病院地区，福岡市東区馬出 3-1-1）1 階，サイエンスカフェおよび会議室 105

共催： 平成 25 年度九州大学教育研究プログラム・研究拠点形成プロジェクト (P & P) A タイプ，九州大学大学院芸術工学研究院応用知覚科学研究センター

Program

Invited papers

1. Some extensions to Nakajima and Ueda's method of the "acoustic language universal"
   Willy WONG, Erin TSANG, Pascal van LIESHOUT (University of Toronto)

   The technique proposed by Nakajima and Ueda "An Acoustic Language Universal") is a fascinating and powerful method yielding new insight into the perceptual information encoded in speech. This poster summarizes some recent work on my part to repeat, to explore and to extend this work. In particular, I will discuss an extension of this work to formant analysis as well to speech production through measurements carried out using a 3D electromagnetic articulograph device.

2. The structure of visual hallucinatory experiences induced by flickering light
   Cordula BECKER*, Mark A. ELLIOTT** (*Ludwig-Maximilians Universität, **National University of Ireland Galway)

   It is a widespread assumption that conscious visual states are based on the interaction of spatially structured information in the environment with the visual nervous system. This stands in contradiction to the fact that visual hallucinations can be observed in a number of pathologies and that it is possible to generate visual hallucinations by temporally, but not spatially, defined electrical and optical stimulation. We show that complex colour and form hallucinations are evoked when subjects are presented with flickering light.

3. Beta rhythms of electroencephalography during voice perception in persons with/without autism spectrum disorders
   Atsuko GUNJI, Hiroshige TAKEICHI, Tomoka KOBAYASHI, Kota SUZUKI, Hisako YAMAMOTO, Akira YASUMURA, Masumi INAGAKI (National Center of Neurology and Psychiatry)

   We investigated the event-related de-synchronization (ERD) of beta frequency band in the sensorimotor cortex during voice perception, which might reflect mirror neuron system activity related to vocalization (Tamura, Gunji et al., 2012). The ratio of beta power between conditions (voice/scrambled voice–nonvoice/scrambled nonvoice) was defined as an index to detect the voice-specific brain response. As a result, the ratio showed right hemispheric dominancy in typically developing children/adults, but not in children with autism spectrum disorders, and therefore the neuropsychological evaluation of electroencephalography (EEG) might be useful as a clinical application to evaluate communication ability.

Contributed papers

4. Neural signature of attentional engagement in temporal judgment

Hiroshige TAKEICHI*, Yoshitaka NAKAJIMA**, Takako MITSUDO**, Shozo TOBIMATSU** (*RIKEN, **Kyushu University)

The purpose of the present study was to reanalyze event-related magnetic fields (ERF) to clarify the time course of brain dynamism associated with temporal judgments. ERFs were measured while the participants were or were not making temporal judgments about stimuli which consisted of three tone bursts defining two neighboring time intervals. Bhattacharyya distance was calculated between the time course of the condition where the participant actively made temporal judgments and that of the condition where the participant passively listened to the stimulus. As a result, the Bhattacharyya distance started to increase at the beginning of the stimulus, and therefore can be considered as a neural signature of attentional engagement.

5. A study of music therapy for chronic schizophrenia patients in Japan

Masako ASANO*, Hiroe TSUKAHARA**, Miki TAKATO**, Youhei KOMATSU***, Motonori FUKUI****, Shiho SUGIHARA*****, Yuichi SAEKI****, Yoshitaka NAKAJIMA****** (*Health Sciences University of Hokkaido, **National Hospital Organization Ryukyu Hospital, ***Nishikyushu University, ****National Hospital Organization Hizen Psychiatric Center, *****University of Hyogo, ****** Kyushu University)

Our purpose was to examine the effects of group music therapy sessions for chronic schizophrenic patients with randomized controlled trials. We conducted music therapy sessions for the experimental group in addition to standard treatment, and we treated the experimental group patients on a weekly basis for a session of about one hour a week over a 12-week period. No major change appeared in the control group, whereas changes in various directions appeared in the experimental group, and the directions of change seemed to depend on the subjects' relationship with music in everyday life.

6. Audio-visual peripheral localization disparity

Ryota MIYAUCHI*, Dae-Gee KANG**, Yukio IWAYA***, and Yôiti SUZUKI** (*Japan Advanced Institute of Science and Technology, **Tohoku University, ***Tohoku Gakuin University)

We investigated how unisensory localizations of audition and vision were reflected in the comparison between spatial information obtained from different modality-specific coordinate systems. We measured the relative location of a sound to a flash and the unisensory perceived location of each sound and flash in a pointing task in the central and peripheral visual fields. We have demonstrated that the locations of auditory and visual events are perceived the same when an auditory event is simultaneously presented at about 5o temporal side of a visual event and the unisensory locations of audition and vision are appropriately reflected in remapping of different modality-specific locations into a unified audio-visual space.

7. Subjective evaluations for inaudibility of differences between original track and watermarked track based on cochlear delay characteristics

Ryota MIYAUCHI, Daiki HAMADA, Atushi HANIU, and Masashi UNOKI (Japan Advanced Institute of Science and Technology)

To investigate inaudibility of a sound distortion caused by the embedded data based on cochlear delay characteristics, we conducted a subjective experiment. We conducted a paired-comparison test and ABX test using music tracks embedded data by the periodical phase modulation method, the direct spread spectrum method, and the cochlear delay method (our proposed method). The results revealed that the CD methods could be used to inaudibly embed the watermarks into original signals.

8. Cortical hemodynamic response patterns to normal and whispered speech
Gerard B. REMIJN*, Mitsuru KIKUCHI**, Yuko YOSHIMURA**, Kiyomi SHITAMICHI**, Sanae UENO**, Yoshio MINABE** (*Kyushu University, **Kanazawa University)

In this study we used near-infrared spectroscopy to investigate the cortical hemodynamic response during the perception of normal and whispered speech in adult listeners ($n = 13$). Results showed that oxygenated hemoglobin values during whispered speech were significantly higher over a right temporal region of interest (ROI) than over a left temporal ROI. No significant differences were found in oxygenated hemoglobin comparisons between normally-vocalized and whispered speech, although the right temporal ROI comparison bordered on significance with whisper inducing the higher value. Since the sound level of whisper is modest as compared to normal speech, increased attentional engagement and/or processing effort during whisper perception may have influenced the results.

9. Temporal dynamics of the knowledge-mediated visual disambiguation process
Tomokazu URAKAWA*,**, Naruhito HIRONAGA*, Katsuya OGATA*, Takahiro KIMURA* Yuko KUME*, Shozo TOBIMATSU* (*Kyushu University, **Japan Society for the Promotion of Science)

The present study attempted to elucidate how fast the knowledge-mediated disambiguation (KMD) of an ambiguous image was implemented in the brain, with a focus on the early time range within 150 ms after the ambiguous image onset. We traced the visual response to a two-tone dalmation-type ambiguous image using a magnetoencephalography (MEG) and performed the Granger causality (GC) analysis. We found deactivation for the ambiguous image in the lateral occipital (LO) area at approximately 120 ms after the image onset when participants disambiguated the image with prior knowledge of its unambiguous version. The GC analysis revealed that the top-down processes among areas of the cuneus, LO, and precuneus existed within 150 ms, a time range at which the deactivation at the LO appeared. These results show an early phase of the KMD and suggest that the KMD begins to be implemented up to 150 ms after the ambiguous image onset in the brain.

10. A magnetoencephalographic study on pain-relief by vibrotactile stimulation
Koichi HAGIWARA, Mariko HAYAMIZU, Naruhito HIRONAGA, Katsuya OGATA, Shozo TOBIMATSU (Kyushu University)

We investigated whether the secondary somatosensory cortex (S2) and insula contribute to the gate control mechanism of pain modulation with vibrotactile stimuli. Somatosensory evoked magnetic fields were recorded during pain ($A\delta$) and tactile ($A\beta$) stimulations, with the former being delivered 60 ms earlier than the latter so that the interaction of the two occurs at the cortical level. Significant amplitude reduction was observed when compared to the sum of amplitudes recorded by stimulation of each sensory modality individually, suggesting that S2 and insula are important for the central gating mechanism.

11. Interactive evolutionary computation for human science
Hideyuki TAKAGI (Kyushu University)

We introduce the four cases that interactive evolutionary computation (IEC) is used for human sciences, which is the reverse direction of most IEC research approaches, i.e. system optimization. These cases include (1) measuring emotional expression ranges of schizophrenic patients, (2) finding unknown auditory knowledge through IEC-based hearing-aid fitting and IEC-based cochlear implant fitting, (3) IEC based on physiological responses to guide human physiological responses to the target physiological conditions, and (4) modeling human awareness mechanism using IEC. We can understand that IEC can be a useful tool for human science through these cases.

12. Computational model-based analysis of musical expectancy
Satoshi MORIMOTO, Gerard B. REMIJN, Yoshitaka NAKAJIMA (Kyushu University)

The computational mechanism underlying the generation of musical expectancy is still uncleared. To address this issue, we conducted a belong/not-belong chord judgment experiment and estimated the computational model. Our results suggest that internal multiple patterns of chord progression are important to the generation of musical expectancy.

13. Cats can see the illusory motion in Rotating snakes
Takeharu SENO*, Rasmus BAATH**, Akiyoshi KITAOKA*** (*Kyushu University, **Lund University, ***Ritsumeikan University)

We examined whether cats see illusory motion in a static image using "rotating snakes" (Kitaoka, 2003). We presented to eleven cats the illusion image as well as its control figure that consists of the same elements as the former but does not give illusory motion to human observers. We measured total contacting time, total watching time, visiting times, as well as hunting actions made by these cats responding to each image. The results suggested that cats can see the illusory motion in Rotating snakes.

14. No time stretching illusion when a tone is followed by a noise
Tsuyoshi KURODA*, Simon GRONDIN** (*Kyushu University, **Laval University)

A sine tone is perceived as longer when it is preceded by a noise than when presented in isolation. This is called the time stretching illusion. We conducted an experiment where the method of constant stimuli was used and found that this illusion does not occur when a tone is followed by a noise.

15. The filled duration illusion with the method of adjustment when filled vs. empty comparison intervals are used
Emi HASUO*, Yoshitaka NAKAJIMA*, Takuya KISHIDA*, Erika TOMIMATSU*, Kazuo UEDA*, Simon GRONDIN** (*Kyushu University, **Laval University)

The duration between the onset and the offset of a continuous sound (filled interval) is often perceived to be longer than the duration between two successive brief sounds (empty interval) of the same physical duration. We examined this phenomenon, sometimes called the filled duration illusion (FDI), with the method of adjustment, where the participants adjusted a comparison interval (filled or empty) to match a standard (filled or empty). Results showed that the FDI occurred clearly for some participants but not for others, and that the participants who showed clear FDI with one comparison type did not always show

such large FDI with the other comparison type. It seemed that the FDI is not a stable phenomenon both across and within participants.

16. Speech development during the first 3 years of life

Yuko YAMASHITA*, Yoshitaka NAKAJIMA*, Kazuo UEDA*, Takeharu SENO*, Yohko SHIMADA**, David HIRSH*** (*Kyushu University, **Doushisha University, ***Sydney University)

The purpose of this study was to explore developmental changes, in terms of spectral fluctuations with Japanese- and English-learning infants during the first 3 years of life. Cepstrum analysis was performed and the correlations between the power fluctuations of the critical-band outputs represented by factor analysis were observed. The present analysis identified four factors with infants and toddlers aged 3 months to 3 years.

17. Perceptual roles of power-fluctuation factors of speech sound revealed by cepstral liftering and zero-shifted factor analysis

Takuya KISHIDA, Yoshitaka NAKAJIMA, Kazuo UEDA, Gerard B. REMIJN, Takuya FUJIOKA (Kyushu University)

The aim of this study was to investigate the perceptual roles of power fluctuations in critical-band filters in speech perception. Japanese speech sounds were resynthesized from four factors obtained in a factor analysis of power fluctuations of cepstrally liftered, so that spectrally smoothed, speech sounds, and mora identifications of the resynthesized sounds were measured. When the factor whose loading had a peak at about 1000 Hz was eliminated, the participants' performance was worse than when any other factor was eliminated.

18. Effects of frequency-band elimination on identification of noise-vocoded Japanese syllables

Shinya ISAJI, Kazuo UEDA, Yoshitaka NAKAJIMA (Kyushu University)

Perceptual roles of frequency bands in noise-vocoded Japanese syllables were investigated. Eight male and two female participants identified 4-band noise-vocoded syllables in which frequency bands were systematically eliminated. Elimination of the lowest band resulted in by and large statistically significant decreases in amounts of information transmitted in voicing; the results suggested that temporal relationship between the lowest band and the other bands may contribute to the voiced vs. voiceless distinction.

19. Factor analyses of critical-band filtered normal and whispered speech

Kiyoto NOGUCHI, Kazuo UEDA, Yoshitaka NAKAJIMA (Kyushu University)

This investigation focuses on how we could determine an adequate number of factors that describe power fluctuations of critical-band filtered normal and whispered speech, based on newly recorded speech materials in which 10 speakers (5 males and 5 females) uttered 200 sentences both in normal and whispered voices. Both cepstral analyses, which could reduce interference on a spectrum caused by vocal fold vibration, and conventional analyses were performed. The cepstral analyses yielded common four factors both in normal and whispered speech with percentages of cumulative contributions more than 75%, whereas the conventional analyses yielded only three common factors in normal speech with percentages of cumulative contributions less than 39%.

20. A magnetoencephalographic study on brain responses to morphing human face into monkey face（脳磁図を用いたヒトからサルへのモルフィング画像に対する顔認知過程の研究）

Emi YAMADA, Katsuya OGATA, Mutsuhide TANAKA, Shozo TOBIMATSU (Kyushu University)

「ヒト（100%）→ヒト（0%）」のモルフィング画像を用い，ヒトの顔とサルの顔に対する認知過程の違いを脳磁図（MEG）で検討することを目的とした。9 名を対象にモルフィング顔画像（H9：ヒト 90%，H5：ヒト 50%，H1：ヒト 10%）観察中の MEG を計測した。顔の倒立効果を検討するため，刺激の呈示は正立と倒立の 2 条件で行った。Matlab により刺激画像の平均輝度，コントラスト，空間周波数を刺激間で一致させた。刺激呈示後，サルかヒトかを判断しボタン押しをしてもらった。その結果，全ての刺激で M170 が右紡錘状回の顔に特異的に反応すると言われる FFA（fusiform face area）周辺で記録された。FFA での M170 の活動量は刺激間で差はなかったが，倒立顔と正立顔，ヒトとサルでは活性の分布が異なった。M170 の潜時は全ての倒立顔で延長し，ヒトの割合が減少すると潜時も延長した。以上より，正立と倒立，ヒトとサルに対する顔認知処理の違いは，FFA の活動量よりも活性の分布が異なるためであることが示唆された。また，倒立顔とサルで潜時が延長するのは種の弁別を反映しているためであると考えられる。

21. An ERP study on subliminal priming effects using emotional faces（事象関連電位を用いた顔情動刺激のサブリミナル・プライミング効果の検討）

Mutsuhide TANAKA, Toshihiko MAEKAWA, Katsuya OGATA, Emi YAMADA, Naomi TAKAMIYA, Shozo TOBIMATSU (Kyushu University)

fMRI 研究ではサブリミナル・プライミング（SP）視覚刺激が前頭前皮質の活動を抑制し，直後の課題遂行に影響することが報告されている。しかし顔情動刺激の SP 効果の脳内処理過程は不明な点が多い。そこで顔情動刺激による SP 効果が ER P に与える影響について検討した。対象は健常成人 10 名である。先ず恐怖と中立表情から曖昧モルフィング画像を作成した。次に SP 刺激（恐怖・中立表情）17 ms 呈示後，300 ms 遅れて標的刺激（中立・曖昧・恐怖表情）を 800 ms 呈示した。標的刺激の表情を判定させ，課題遂行中の ERP を測定した。その結果，恐怖 SP 条件で，曖昧表情に対する心理評定が恐怖側に偏向した。ERP では曖昧表情に対する右前頭部（F8）の P2 振幅と左後頭側頭部（T5）の N170 振幅がわずかに増大する傾向を認めた。恐怖表情による SP 効果により恐怖刺激に対する予測的注意が喚起され，曖昧表情が恐怖に偏向した刺激として処理された可能性がある。

22. Co-activation of small hand muscles depends on the synergy of neighborhood contracting muscles but not M1 somatotopy（小手筋の同時活性化に対する一次運動野の興奮性は隣接の随意運動する筋に依存する）

Katsuya OGATA, Hisato NAKAZONO, Tsuyoshi OKAMOTO, Shozo TOBIMATSU (Kyushu University)

小手筋の 1 つを収縮させると，他の筋が不随意に収縮する現象 (同時活性化) がしばしば観察される。同時活性化に対し隣接する筋の随意運動による影響を検討するため，短母指外転筋 (APB)，小指外転筋 (ADM) 収縮時に第一背側骨間筋 (FDI) の MEP を評価した。健常被験者 7 名で右手 FDI の安静を保ちつつ随意的に APB あるいは ADM を弱収縮 (最大収縮の約 10%) させた。安静時と APB・ADM 収縮下で左 M1 刺激による FDI の MEP を計測した。その結果，APB・ADM 収縮下で不随意に弱い FDI の同時活性化がみられ，MEP は増大した。同時活性化による FDI の筋活動量を条件間で同等に制御できた被験者でも，ADM 収縮で FDI の MEP がより増大した。よって同時活性化による M1 の興奮性に APB・ADM の部位間で差があることを認めた。手指開散の共同筋として ADM 収縮時に FDI がより活性化したと推測した。

23. 反復性経頭蓋交流電気刺激（tACS）を用いた MEP のオンラインとオフライン効果：至適刺激条件の検討

中薗寿人，緒方勝也，飛松省三（九州大学）

反復性 tACS の MEP に対するオンライン（ON）とオフライン（OFF）効果の至適条件を検討することを目的とした。tACS（持続 90 秒，刺激強度 1 mA）の刺激周波数（5，10，20，40 Hz），刺激部位（左 M1-C4，左 M1-Pz），試行間間隔（3 分，5 分）を変え，刺激 20 秒後から MEP の ON 効果と終了後の OFF 効果を評価した。その結果，刺激部位（$n = 5$）は M1-Pz で周波数に関わらず ON 効果があり，OFF 効果もみられた。tACS によるフリッカー誘発は M1-Pz で M1-C4 より少なく，その程度も弱かった。10 Hz と 20 Hz の tACS を各 4 試行行った場合，3 分間隔（$n = 4$）で 20 Hz の tACS のみ ON 効果が大きく，OFF 効果もみられた。一方，5 分間隔（$n = 6$）では，ON 効果は小さく OFF 効果も少なかった。反復性の短時間 tACS の場合，電極配置は M1-Pz が適切である。試行間間隔 3 分では各試行間の相互作用が生じる可能性がある。

24. 色相と意味の関連における文化差：単語判断課題を用いた検討

徐冰，光藤宏行（九州大学）

本研究では，色相と単語の意味の関連が文化背景によって異なるかどうかを単語判断課題によって検討した。実験では，失敗と成功に関する単語を赤・緑・青の 3 色いずれかに設定し，実験参加者を日本人と中国人を対象として，判断にかかる反応時間を測定した。その結果，中国人の場合は失敗に関する単語に対しては赤が緑より速く判断されたが，日本人の場合は全ての条件で反応時間の差は小さく，この結果は（a）文化背景によって色と意味の関連についての情報処理が異なること，さらに（b）この課題は言語処理との関わりで考える必要があることが分かった。

25. 色字共感覚と視覚的作業記憶

西由紀子，光藤宏行（九州大学）

本研究の目的は，知覚よりも高次な機能である視覚的作業記憶において，色字共感覚者の感じる共感覚色が保持されているのかを検討することであった。色字共感覚者を対象に，文字変化が共感覚色の変化を伴う条件と伴わない条件を設定し，変化検出課題を用いて記憶保持容量を測定した。その結果，文字変化が色の変化を伴う条件では保持容量が大きく，共感覚色は視覚的作業記憶に保持されていることが示唆される。

26. 残響が空隙転移錯覚に与える影響について

久保 翔平，Gerard B. REMIJN, 中島 祥好（九州大学）

残響下で聴覚の体制化がどのように行われるかを調べるため，空隙転移錯覚とよばれる聴覚の錯覚現象を用いて残響による影響を調べた。本研究では，残響時間を任意に変え，長いグライド音・短いグライド音・空隙の 3 要素を組み合わせた複数の刺激パターンを実験参加者に提示し，どのように聞こえたかを回答させる現象観察実験を行った。実験結果から，残響下ではあらゆる刺激パターンにおいて，長い音よりも短い音の方が途切れて聞こえる傾向があることが示された。

27. ケプストラム分析を用いた音声の因子分析

藤岡拓也, 上田和夫, 中島祥好（九州大学）

8 言語の音声を臨界帯域フィルターに通し，パワー変動の相関から因子分析を行うことにより，言語間に共通する 3 因子と 4 周波数帯域が導き出されていた。しかし，従来の分析方法では，話者の音声の基本周波数によって分析可能な因子数が影響を受けることが，イギリス英語と日本語とで確かめられたため（基本周波数が 260 Hz 以下ならば 3 因子，150 Hz 以下

ならば 4 因子の分析が可能)，基本周波数の影響を取り除くことのできるケプストラム分析を組み込んで因子分析を行い，どのような因子が得られるのかを調べた。日本語，イギリス英語，アメリカ英語，フランス語について分析を行ったところ，これらの言語に共通する 4 因子が得られ，ほぼ共通する 4 帯域に音声を分割することができた。これらの帯域は，雑音駆動音声を知覚するために必要な 4 帯域と関係すると考えられる。

3.9 進化計算：講習会とパネル討論

日時： 2013 年 12 月 13 日（金）15:00-18:00

会場： 九州大学大橋キャンパス（福岡市南区塩原 4-9-1），大橋サテライト（西鉄大橋駅前東口交差点南西角）2 階セミナー室

共催： 進化計算学会，九州大学大学院芸術工学研究院応用知覚科学研究センター

企画者： 高木英行（九州大学芸術工学研究院／応用知覚科学研究センター）

趣旨： 学会横断型を目指して進化計算学会が設立されて 4 年目を迎えました．まだ会員数が少ないこともあって，現会員の取り組むテーマ，分野は偏っています．しかし，進化計算が関わり得る学術分野はもっと広いはずで，直接関係する natural computing や人工生命をはじめ，各種マイニング，ネットワーク，VR などの工学や情報分野，さらには，心理，生理，経済，言語，社会，などの人文社会分野にも貢献できるものと思います．これらの分野で進化計算のことを知れば一緒になって取り組んで頂ける方々との人的ネットワークが欠けていることが研究の広がりを欠く理由の 1 つではないかと思います．そこで，進化計算学会と関連学会との広がりを期待して，これらの分野の方々の情報交換を行うことと，進化計算が貢献できるであろう分野について意見交換をすることを目的にパネル討論会を行います．また，それに合わせて，実用的な統計検定の講習会も行います．計算知能，機械学習，パターン認識などで提案手法の優位性を示すには統計検定が必要です．大学でも統計・確率の授業はあるのですが，数学的側面が主であり，統計検定の利用者にとって即役立つ実用的な知識提供を目的にしている訳ではないことが多いように思われます．この講習会では統計検定の数学的側面ではなく「どのような場合にどのような検定手法をどのように使えばよいのか」を解説します．

プログラム

第 **1** 部 **15:00-16:30** 講習会「統計検定の正しい使い方：それで査読に通りますか」（講師：高木英行）

第 **2** 部 **16:45-18:00** パネル討論「進化計算が貢献できる他学術分野の領域とは」

3.10 知覚科学のための多変量解析特別講義

日時： 2014 年 1 月 9 日（木）13:00-14:30; 16:30-18:00

会場： 九州大学大橋キャンパス 3 号館 2 階 321 教室

講師： 足立浩平 教授（大阪大学人間科学研究科）

企画者： 坂田年男（九州大学芸術工学研究院／応用知覚科学研究センター）

講義内容

13:00-14:30 「多変量データ解析の諸方法」：行列どうしの和と積を解説した後，諸方法の基礎となる回帰モデルを導入する。その後，データ行列の低階数近似を行う主成分分析，および，これに独自因子の概念を付加した因子分析を解説する。最後に対象を分類するためのクラスター分析に言及する。

16:30-18:00 「入出力三相データの主成分分析」：入力 (刺激)× 出力 (反応)× 個体 (人) の三相データに内在する構造を探るための主成分分析 (PCA) は，[1] 二相化した配列の PCA, [2] Tucker2, [3]

Tucker3, [4] Parafac, [5] 個体を平均したデータの PCA の 5 種に分類され，[1] から [5] に向かって制約が強くなるという階層関係があるが，[1]~[5] のそれぞれを解説する。



3.11 The 11th Perceptual Frontier Seminar

Date and time: 22 January 2014, 18:00-20:00

Venue: Room 601, Building 3, Ohashi Campus, Kyushu University

Program

Talk 1: Cognitive linguistics meets corpora: Examples of human spatial cognition reflected in English language
Miharu FUYUNO*
*Kyushu University

Three-sentence abstract: This talk will discuss several examples from cognitive linguistic studies such as English spatial prepositions and constructions, after providing introductory descriptions of cognitive linguistics and corpus linguistics. Cognitive Linguistics has been developing as a descriptive framework for linguistic investigations with its central principal of analyzing languages as reflections of human cognitive abilities. In this talk, reflections of human spatial cognitions in uses of English prepositions (on, in, at) and related issues will be discussed as well as increasing applications of corpora in cognitive linguistic studies.

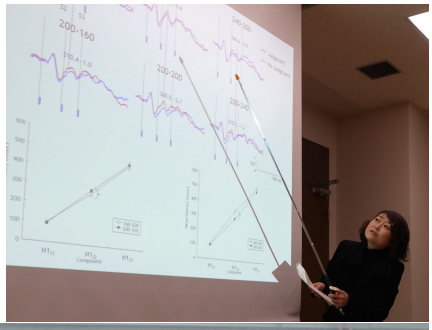
Talk 2: Perceived durations of filled and empty intervals measured with magnitude estimation
Emi HASUO*, Kazuo UEDA*, Takuya KISHIDA*, Haruna FUJIHIRA*, Satoshi MORIMOTO*, Gerard B. REMIJN*, Kimio SHIRAISHI*, Shozo TOBIMATSU*, and Yoshitaka NAKAJIMA*
*Kyushu University

Three-sentence abstract: The purpose of this study was to examine whether the relationship between the perceived durations of a filled interval (the duration between the onset and the offset of a sustained sound) and an empty interval (the duration between the onsets of two successive brief sounds) differed for shorter and longer intervals. Subjective durations of filled and empty time intervals of 30, 49, 81, 134, 221, 364, and 600 ms were measured from 41 participants using magnitude estimation. Results showed that the subjective durations of filled intervals increased linearly as the duration lengthened, whereas those of empty intervals increased with a steeper slope for durations up to 134 ms than for longer durations (Data of a related experiment with electroencephalography may also be presented).

Talk 3: Perceptual inequality between two neighbouring time intervals defined by sound markers: correspondence between neurophysiological and psychological data

Takako MITSUDO*, Yoshitaka NAKAJIMA*, Hiroshige TAKEICHI**, and Shozo TOBIMATSU*
*Kyushu University, **RIKEN

Three-sentence abstract: A slow negative component (SNCt) in the right pre-frontal brain area [around the F8 electrode in electroencephalographic (EEG) observations] after stimulus, which was found to be associated with judgment of the equality/inequality of two neighbouring time intervals (T1 and T2) in one of our previous studies, was further investigated. The SNCt appeared in the right-frontal area after the presentation of T1 and T2, and its magnitude was larger for the temporal patterns causing perceptual inequality; it was also correlated with perceptual equality/inequality of the same stimulus pattern. The SNCt turned out to continue up to about 400 ms after the end of T2, and was established as a signature of equality/inequality judgment as well as of inequality detection.



3.12　味覚・嗅覚センサ研究開発センター　設立記念シンポジウム

日時：　2014 年 1 月 28 日（火）13:30-17:00

会場：　九州大学伊都キャンパス，稲盛財団記念館

主催：　九州大学味覚・嗅覚センサ研究開発センター，九州大学大学院芸術工学研究院応用知覚科学研究センター

プログラム

13:00 受付開始

13:30 味と匂いを目で見る
　都甲 潔 主幹教授 (九州大学大学院システム情報科学研究院／味覚・嗅覚センサ研究開発センター長)

14:15 匂いの記号論，コーディング，匂いイメージセンサ
　林 健司 教授（九州大学大学院システム情報科学研究院）

14:45 味覚健康科学創成の研究戦略
　二ノ宮 裕三 教授（九州大学大学院歯学研究院）

15:15-15:30 休憩

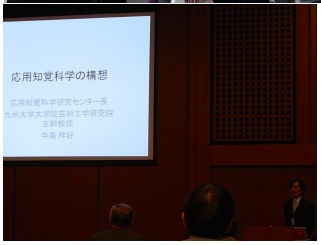
15:30 応用知覚科学の構想
　中島 祥好 主幹教授（九州大学大学院芸術工学研究院／応用知覚科学研究センター長）

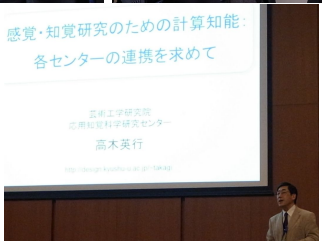
16:00 感覚・知覚研究のための計算知能：各センターの連携を求めて
　高木 英行 教授（九州大学大学院芸術工学研究院）

16:30 生理人類学からみた応用研究
　綿貫 茂喜 教授（九州大学大学院芸術工学研究院）

17:00 閉会






3.13 The 12th Perceptual Frontier Seminar: Biodiversity in Perception

Date and time: 18 February 2014, 17:00-19:00

Venue: Room 411, 1st floor of the Build. 4, Ohashi Campus, Kyushu University

Program

1. Changes in optic flow perception precede locomotor development
Nobu SHIRAI* and Tomoko IMURA**
*Niigata University, **Niigata University of International and Information Studies

We examined the interactive developmental process between voluntary locomotor actions and perception of optic flow, a critical cue for perceiving and controlling the direction of locomotion, in infancy. A pair of cross-sectional (Experiment 1) and longitudinal (Experiment 2) investigations was conducted to test infants' visual preferences for several optic flows (radial expansion, contraction, clockwise rotation and counterclockwise rotation) and their locomotor state. Results suggest that the visual preference for contraction flow drastically decreases just before the emergence of locomotion, and offer a new perspective on the development of visuomotor coordination; change in particular visual perception precedes and potentially promotes the emergence of related motor actions in early development.

2. Object recognition behind the slit viewing by chimpanzees and human infants
Tomoko IMURA*
*Niigata University of International and Information Studies

While human adults tend to process global features before analyzing local features on the visual object recognition (global precedence effect), nonhuman primates, avian species, or human infants show little or no tendency of the global precedence. The present study examined the ability to integrate global motion and global form information in chimpanzees and human adults (Experiment 1), and 3 to 12-month-old human infants (Experiment 2) by using a slit-viewing task. The results suggest that humans were superior to chimpanzees in the ability to integrate spatio-temporal information and such ability emerges by 5 month of age in human infants.

3. The effect of context on color preference
Chihiro HIRAMATSU* and James ANDERSON**
*Kyushu University, **University of Stirling

Preference for colors might be contextual, and a color preferred in a certain context may give rise to avoidance in another context. In this study, we investigated whether contexts affect monkeys' behavior toward color. Squirrel monkeys preferred colors associated with their daily foods in a foraging context, but the effect was opposite when the color was a background on which food was placed, suggesting that contexts or experiences modulate color preferences.

Break During the break, auditory demonstrations about time perception, provided by Yoshitaka NAKAJIMA, will be presented via iPads.

4. Gustation and feeding behavior in the fruit fly Drosophila melanogaster
Teiichi TANIMURA*
*Department of Biology, Graduate School of Sciences, Kyushu University

We are interested in knowing how the feeding behavior of Drosophila is regulated by gustation and internal mechanisms. We showed that Drosophila do not simply respond to taste stimulus, but regulate the feeding behavior through a decision-making process. Drosophila can learn the nutritional value of non-sweet sugar. They also have an ability to modulate their feeding preference to amino acids depending on the internal nutritional state.

5. Acoustic tracking of FM bats using microphone array system

Ikuo MATSUO*, Alyssa WHEELER**, Laura KLOEPPER**, Jason GAUDETTE**, and James A. SIMMONS**

*Tohoku Gakuin University, **Brown University

The purpose of this research is to clarify the changes of acoustic characteristics of echolocation calls according to environments. These acoustic characteristics were computed by tracking the flight path of the bat from the time differences of arrivals (TDOA) at the microphone array system in the flight room. It was clarified that the amplitudes of echolocation calls were changed according to complexity of environment.

4 業績リスト Publications

2014 年（平成 26 年）3 月 31 日現在

4.1 知覚脳科学グループ Perceptual and Brain-Scientific Research Group

1. 中島 祥好 研究室 Yoshitaka NAKAJIMA

(a) 英語学術論文・出版物 English Publication

i. Hasuo, E., Nakajima, Y., Tomimatsu, E., Grondin, S., and Ueda, K. (2014). The occurrence of the filled duration illusion: a comparison of the method of adjustment with the method of magnitude estimation, *Acta Psychologica*, 147, 111-121.

(b) 日本語学術論文・出版物 Japanese Publications

i. 箱田 裕司，行場 次朗，中島祥好，多数 (2013)．認知心理学ハンドブック，有斐閣，「音知覚」の項を担当.

ii. 中島祥好，佐々木隆之，上田和夫，レメイン，G. B.（2014）．聴覚の文法，コロナ社.

iii. 中島祥好 (2014). 聴覚認知の心理学, *Clinical Neuroscience*, 32, 169-172.

(c) 国際会議発表 International Conference Presentations

i. Hasuo, E., Nakajima, Y., Kishida, T., Tomimatsu, E., Ueda, K., and Grondin, S. (2013). The filled duration illusion with the method of adjustment when filled vs. empty comparison intervals are used, *Fechner Day 2013, The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

ii. Nakajima, Y., Takeichi, H., Mitsudo T., and Tobimatsu, S. (2013). Perceptual processing of pairs of acoustically marked time intervals: correspondence between psychophysical and electrophysiological data, *Fechner Day 2013, The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

iii. Kishida, T., Nakajima, Y., and Ueda, K. (2013). Effects of elimination of power-fluctuation factors from critical-band noise-vocoded speech, *The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

iv. Isaji, S., Ueda, K., and Nakajima, Y. (2013). Effects of frequency-band elimination on identification of noise-vocoded Japanese syllables, *The 18th Auditory Research Forum*, Kitakomatsu, Japan.

v. Ueda, K., Nakajima, Y., and Fujioka, T. (2013). Factor analyses of power fluctuations in spoken sentences: applying cepstral analyses, *The 18th Auditory Research Forum*, Kitakomatsu, Japan.

vi. Nakajima, Y., Ueda, K., Fujimaru, S., and Ohsaka, Y. (2013). Sonority in British English, *21st International Congress on Acoustics, 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

vii. Ueda, K., Nakajima, Y., Doumoto, K., Ellermeier, W., and Kattner, F. (2013). Disruptive effect of unattended noise-vocoded speech on recall of visually presented digits: interaction between the number of frequency bands and languages, *21st International Congress on Acoustics 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

viii. Li, F., Nakajima, Y., and Ueda, K. (2013). Influence of duration on the perception of consonants /x/ and /j/ in Chinese, *21st International Congress on Acoustics, 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

ix. Ueda, K., and Nakajima, Y. (2013). Comparison of factors extracted from power fluctuations in critical-band-filtered homophonic choral music, *Auditory Resarch Meeting, the Acoustical Society of Japan*, Kyotanabe, Japan.

(d) 国内学会発表，研究会など Domestic Conference Presentations

i. 中島祥好 (2013)．聴覚の文法，テーマワークショップ：聴覚科学研究最前線．

ii. 中島祥好 (2013)．音声信号の騒音，残響に対する耐性を増す：聴覚の特性を考慮したアルゴリズム，九州大学新技術説明会．

iii. 上田和夫，中島祥好，佐々木隆之，レメイン，G. B. (2014). 聴覚の文法：音声知覚への応用, 日本音響学会春季研究発表会．

iv. 中島祥好，佐々木隆之，上田和夫，レメイン，G. B. (2014). 聴覚の文法, 日本音響学会春季研究発表会．

v. 伊佐次伸也，上田和夫，中島祥好 (2014). 複数の周波数帯域の除去が雑音駆動音声の知覚に与える影響, 日本音響学会聴覚研究会．

vi. 野口聖人，上田和夫，中島祥好 (2014). 臨界帯域フィルターを用いた音声の因子分析:通常発声とささやき声, 日本音響学会聴覚研究会．

(e) 受賞 Award

i. 社団法人日本音響学会九州支部，学生表彰，2014 年 3 月 29 日. 伊佐次伸也, 上田和夫, 中島祥好 (2014). 複数の周波数帯域の除去が雑音駆動音声の知覚に与える影響, 日本音響学会聴覚研究会資料，Vol. 44, No. 1, H-2014-9, pp. 45-51.

2. 伊藤 裕之 研究室 Hiroyuki ITO

(a) 英語学術論文・出版物 English Publications

i. Bai, Y., and Ito, H. (2014). Effect of surrounding texture on the pursuit-pursuing illusion, *i-Perception*, 5, 1, 20-40.

ii. Ito, H., Ogawa, M., and Sunaga, M. (2013). Evaluation of an organic light-emitting diode display for precise visual stimulation, *Journal of Vision*, 13, 7, 1-21.

iii. Seno, T., Palmisano, S., Ito, H., and Sunaga, S. (2013). Perceived gravitoinertial force during vection, *Aviation, Space and Environmental Medicine*, 84, 971-974.

iv. Wexler, M., Glennerster, A., Cavanagh, P., Ito, H., and Seno, T. (2013). Default perception of high speed motion, *Proceedings of the National Academy of Sciences*, 110, 17, 7080-7085.

(b) 国際会議発表 International Conference Presentation

i. Ogawa, M., Seno, T., Ito, H., and Sunaga, M. (2013). Time course of attational shift in response to another person's gaze direction, *European Conference on Visual Perception*.

(c) 国内学会発表，研究会等 Domestic Conference Presentation

i. 伊藤裕之 (2013)．錯視と順応，日本心理学会．

3. 須長 正治 研究室 Shoji SUNAGA

(a) 英語学術論文・出版物 English Publications

i. Ito, H., Ogawa, M., and Sunaga, S. (2013). Evaluation of an organic light-emitting diode display for precise visual stimulation, *Journal of Vision*, 13,7 article 6, 1-21.

ii. Seno, T., Palmisano, S., Ito, H., and Sunaga, S. (2013). Perceived gravitoinertial force during vection, *Aviation, Space and Environmental Medicine*, 84, 971-974.

iii. Nakashima, Y., Sunaga, S., Seno, T., and Oi, N. (2013). Investigation of sperctral power distributions of LED light sources to provide preferred colored of natural objects, *Proceedings of the 12th Congress of the International Colour Association AIC Color 2013 Newcastle upon Tyne*, 655-658.

iv. Sunaga, S., Ogura, T., and Seno, T. (2013). Evaluation of a dichromatic color-appearance simulation by a visual search task, *Optical Review*, 20, 2, 83-93.

(b) 日本語学術論文・出版物 Japanese Publication

i. 玉田靖明，伊東文博，佐藤雅之，須長正治 (2013)．大きな両眼網膜像差による奥行きの知覚における刺激の運動と変位の効果，映像情報メディア学会誌，67, 12, 479-484.

(c) 国際会議発表 International Conference Presentation

i. Nakashima, W., Sunaga, S., Seno, T., and Oi, N. (2013). Investigation of sprcral power distributions of LED Light sources to provide preferred colored of natural objects, *AIC colour*.

(d) 国内学会発表，研究会等 Domestic Conference Presentations

i. 須長正治 (2013)．視覚探索課題を用いた 2 色覚者の色の見えシミュレーションの検証とその修正モデルの提案, 視覚科学技術コンソーシアム，平成年度第 1 回メンバーイベント.

ii. 須長正治 (2014)．色彩テクスチャパターンの知覚的平均，色ランダムドットからスーラの点描画まで，日本色彩学会 H25 年度色覚研究会.

iii. 稲田憲澄，鬼木麻弓，須長正治，妹尾武治 (2013)．スーラの点描画における知覚的平均色と測色的平均色の比較，日本色彩学会，第 1 回秋の大会.

iv. 須長正治，山内佑夏，佐藤雅之 (2013)．色残像極性の順応後提示刺激の彩度依存性，日本色彩学会，第 1 回秋の大会.

v. 山内佑夏，佐藤雅之，須長正治 (2013)．色順応による高彩度色光の色の見えの変化，日本視覚学会，2013 年夏季大会.

vi. 中島航, 須長正治, 妹尾武治, 大井尚行 (2013)．自然物を好ましくみせる LED 照明の分光分布の検討，日本色彩学会，第 44 回全国大会.

vii. 中島航, 須長正治, 妹尾武治, 大井尚行 (2013)．調整法を用いた自然物に好ましさを与える分光分布の検討，第 22 回 VR 心理学研究会.

4. 大井 尚行 研究室 Naoyuki Oi

(a) 日本語学術論文・出版物 Japanese Publications

i. 大井尚行 (2013)． 第 1 章人間が感じる “快適” とはなにか？ 五感と快適「五感で捉える自動車内装・室内空間の快適化技術大全」，サイエンス&テクノロジー.

ii. 大井尚行 (2013)．日本建築学会編，建築環境心理生理用語集，彰国社.

(b) 国内学会発表，研究会等 Domestic Conference Presentations

i. 藤田彩香，田上健一，朝廣和夫，大井尚行，谷正和，井上朝雄．(2014)．人口減少地域における住宅のレジリエンスに関する基礎的研究，スペイン・アラゴン州ウエスカ県エンブンにおけるケーススタディ，日本建築学会九州支部研究発表会．

ii. 星川正考，井上朝雄，土屋潤，大井尚行，須長正治，川鍋亜衣子．(2014)．現代日本の戸建住宅における室内の彩福岡の住宅展示場のモデルハウスにおける内装仕上材料の色彩特性に関する実態調査，日本建築学会九州支部研究発表会．

iii. 張怡，大井尚行，高橋浩伸，川本陽一 (2014)．小規模運動空間における壁面色彩の違いによる心理的効果，無彩色・低彩度色に関する感情気分，日本建築学会，九州支部研究発表会．

iv. 内田彩季，大井尚行，高橋浩伸，川本陽一 (2014)．小規模飲食店の「入りやすさ」と店舗内の居心地に関する外観デザインからの評価, 日本建築学会，九州支部研究発表会．

v. 田澤隼，大井尚行，川本陽一，高橋浩伸 (2014)． シークエンス空間における連続印象評価の手法に関する研究，調査票，発話，評価装置の比較，日本建築学会，九州支部研究発表会．

vi. 植田征道，大井尚行，高橋浩伸，川本陽一 (2014)．居住地とまちづくり経験の有無による景観評価の違い，キャプション評価法を用いた玉名市高瀬地区での調査，日本建築学会，九州支部研究発表会．

vii. 山下弘貴，大井尚行，高橋浩伸，川本陽一 (2014)．キャプション評価法による駅前広場の景観評価に関する研究　福岡市内の西鉄大橋駅駅前広場を対象とした景観評価, 日本建築学会，九州支部研究発表会．

viii. 高橋浩伸，大井尚行，Y-HOUSE (2013)．ユーザビリティの高い設計手法の提案，日本建築学会大会．

ix. 植田征道，大井尚行，川本陽一，高橋浩伸 (2013)．居住地とまちづくり経験の無い参加者と経験の有る参加者との景観評価の違い，キャプション評価法を用いた玉名市高瀬地区での調査，日本建築学会大会．

x. 内田彩季，大井尚行，川本陽一，高橋浩伸 (2013)．両隣の店舗の外観デザインからの影響を考慮した「入りやすさ」に関する研究，日本建築学会大会．

xi. 田澤隼，大井尚行，川本陽一，高橋浩伸 (2013)．床面・壁面に生じた明暗の見えが空間の印象に与える影響に関する研究，不均一な照度分布の空間に対する明るさ感評価，日本建築学会大会．

xii. 張怡，大井尚行，川本陽一，高橋浩伸 (2013)．運動空間における壁面色彩の違いによる心理的効果，小規模空間と無彩色・低彩度色の場合，日本建築学会大会．

5. 山下 友子 研究室 Yuko YAMASHITA

(a) 英語学術論文・出版物 English Publication

i. Yamashita Y., Nakajima Y., Ueda K., Remijn G., and Hirsh D. (2014). Peer evaluation and types of revisions in EFL writing. 言語科学, 49, 67-77.

(b) 国際会議発表 International Conference Presentation

i. Yamashita Y., Nakajima Y., Ueda K., Seno T., Shimada Y., and Hirsh D. (2013). Temporal periodicity with Japanese- and English-learning infants. *The 22nd Virtual Reality Psychology International Conference*, Fukuoka, Japan.

(c) 国内学会発表，研究会等 Domestic Conference Presentation

i. 山下友子 (2013). 乳幼児音声の音響的分析とそれに基づく音声教材の提案, 映画英語教育学会九州支部大会.

6. 飛松 省三 研究室 Shozo TOBIMATSU

(a) 英語学術論文・出版物 English Publications

i. Yamasaki T., Fujita T., Kamio Y., and Tobimatsu S. (2013). Electrophysiological assessment of visual function in autism spectrum disorders. *Neurosci Biomed Engineer*, 1, 5-12.

ii. Fujita, T., Yamasaki, T., Kamio, Y., Yasumoto, S., Hirose, S., and Tobimatsu, S. (2013). Altered automatic face processing in individuals with high-functioning autism spectrum disorders: Evidence from visual evoked potentials, *Res. Autism. Spectr. Disord.*, 7, 710-720.

iii. Kimura, T., Ogata, K., and Tobimatsu, S. (2013). Repetitive paired-pulse transcranial magnetic stimulation over the visual cortex alters visual recovery function, *Brain Stimul.*, 6 298-305.

iv. Kanamori, Y., Isobe N., Yonekawa T., Matsushita T., Shigeto, H., Kawamura N., Murai H., Tobimatsu, S., and Kira, J. (2013). Multimodality evoked potentials for discrimination of atopic myelitis and multiple sclerosis, *Clin. Exp. Neuroimmunol.*, 4, 29-35.

v. Kanamori Y., Shigeto H., Hironaga N., Hagiwara K., Sakata A., Hashiguchi K., Morioka T., Tobimatsu S., and Kira J. (2013). Minimum norm estimation analysis in MEG can delineate the onset of interictal epileptic discharges: A comparison with ECoG findings, *NeuroImage: Clinical.*, 2, 663-669.

vi. Yamasaki, T., Ogata, K., Maekawa, T., Ijichi I., Katagiri M., Mitsudo T., Kamio Y., and Tobimatsu, S. (2013). Rapid maturation of voice and linguistic processing systems in preschool children: A near-infrared spectroscopic study, *Experimental Neurology*, 250, 313-320.

vii. Taniwaki, T., Yoshiura, T., Ogata, K., Togao O., Yamashita K., Kida H., Miura S., Kira, J., and Tobimatsu, S. (2013). Disrupted connectivity of motor loops in Parkinson's disease during self-initiated but not externally-triggered movements, *Brain Research*, 512, 45-59.

viii. Maekawa, T., Katsuki S., Kishimoto J., Onitsuka, T., Ogata, K., Yamasaki T., Ueno T., Tobimatsu, S., and Kanba S. (2013). Altered visual information processing systems in bipolar disorder: Evidence from visual MMN and P3, *Frontiers in Human Neuroscience*, Jul. 26. doi:10.3389/fnhum.2013.00403.

ix. Uehara T., Yamasaki T., Okamoto T., Koike T., Kan S., Miyauchi S., Kira J., and Tobimatsu S. (2014). Efficiency of a "small-world" brain network depends on consciousness level: A resting-state fMRI study, *Cereb. Cortex*, 24, 1529-1539.

x. Hagiwara K., Ogata K., Okamoto T., Uehara T., Hironaga N., Shigeto H., Kira J., and Tobimatsu S. (2014). Age-related changes across the primary and secondary somatosensory areas: An analysis of neuromagnetic oscillatory activities, *Clin. Neurophysiol.*, 125, 1021-1029.

xi. Miyaji, H., Hironaga H., Umezaki T., Hagiwara, K., Shigeto H., Sawatsubashi M., Tobimatsu, S., and Komune, S. (2014). Neuromagnetic detection of the laryngeal area: Sensory-evoked fields to air-puff stimulation, *NeuroImage*, 88, 162-169.

xii. Kimura, T., Ogata, K., Nakazaono H., and Tobimatsu, S. (2014). Repetitive paired-pulse transcranial magnetic stimulation over the visual cortex selectively inhibits focal flash VEPs, *Brain Stimulation*, 7, 275-280.

(b) 日本語学術論文・出版物 Japanese Publications

i. 飛松省三 (2013). 10 章, 脳波を用いた顔認知研究. 柿木隆介 (編). 顔を科学する. 東京大学出版会, 169-182.

ii. 飛松省三 (2013). 羽ばたき振戦. 辻省次, 高橋良輔 (編) パーキンソン病と運動異常, アクチュアル脳・神経疾患の臨床. 中山書店, 東京, 128-133.

iii. 飛松省三 (2013). 視床障害の症候：体性感覚障害. *Clinical Neuroscience*, 31, 93-95.

iv. 飛松省三 (2013). 脳波判読の基礎. 神経治療, 30, 122-125.

v. 飛松省三 (2013). 医学と心理学をつなぐ—脳生理学的アプローチ—. 基礎心理学研究, 32, 88-93.

(c) 国際会議発表 International Conference Presentation

i. Yamasaki, T., Kira, J., Kanba, S., and Tobimatsu, S. (2014). Higher level but not lower level parallel visual pathways are functionally altered in patients with mild cognitive impairment, *ICCN2014*.

(d) 国内学会発表，研究会等 Domestic Conference Presentation

i. 飛松省三 (2013). いわゆる α 波と μ 波についての一考察，2013 年度日本生体医工学会九州支部特別講演会.

(e) 受賞 Award

i. 2013 年度日本神経学会 Excellent Teacher 賞, 飛松省三.

4.2 応用知覚学グループ Applied Perceptual Research Group

1. 坂田 年男 研究室 Toshio SAKATA

(a) 英語学術論文・出版物 English Publication

i. Iwasa, M., and Sakata, T. (2014). One-sided tests for matrix variate normal distributions, *7th IMBIC International Conference:MSAST*, 2, 79-91.

(b) 国際会議発表 International Conference Presentations

i. Miyazaki, M., Sumi, T., and Sakata, T. (2014). Rank of n-tensors with size $2 \times \cdots \times 2$, *Innovation in statistics and related mathematics through computational algebraic statistics*.

ii. Sumi, T., Sakata, T., and Miyazaki, M. (2014). Hurwitz-radon function, absolutely nonsingular tensor and typical ranks of 3-tensors, *Innovation in statistics and related mathematics through computational algebraic statistics*.

iii. Iwasa, M., and Sakata, T. (2013). One-sided tests for matrix variate normal distributions, *MSAST 2013*.

iv. Sakata, T., Sumi, T., and Miyazaki, M. (2013). Estimation of the typical ranks of $2 \times 2 \times \cdots \times 2$ tensors through intrinsic dimension estimators, *ERCIM 2013*.

v. Sakrai, R., and Sakata, T. (2013). Holonomic decent minimization method for restricted maximum likelihood estimation, *59th ISI world Statistics Congress*.

(c) 国内学会発表，研究会等 Domestic Conference Presentation

i. 坂田年男，角俊雄，宮崎充弘，前原貴憲 (2014)． テンソルデータの階数問題 (計算代数統計的視点から)，平成 25 年度統計学会春季大会.

2. 高木 英行 研究室 Hideyuki TAKAGI

(a) 英語学術論文・出版物 English Publication

i. Pei, Y., and Takagi, H. (2013). Accelerating IEC and EC searches with elite obtained by dimensionality reduction in regression spaces, *Journal of Evolutionary Intelligence, Springer-Verlag Berlin Heidelberg*, 6, 1, 27-40.

(b) 国際会議発表 International Conference Presentations

i. Pei, Y., and Takagi, H. (2013). Fitness landscape approximation by adaptive support vector regression with opposition-based learning, *IEEE Int. Conf. on Systems, Man, and Cybernetics (SMC 2013)*.

ii. Takagi, H. (2013). Interactive evolutionary computation for analyzing human characteristics, *Symposium on Emergent Trends in Artificial Intelligence & Robotics (SETINAIR2013)*.

iii. Takagi, H. (2013). Overview of our research on interactive evolutionary computation, *Japan-Finland Joint Seminar 2013*.

iv. Takagi, H. (2013). Statistical tests for computational intelligence research and human subjective tests, *2013 IEEE Symposium Series on Computational Intelligence*.

v. Takagi, H. (2013). Interactive evolutionary computation as a tool for human science, 九州大学芸術工学研究院応用知覚科学研究センター.

(c) 国内学会発表，研究会等 Domestic Conference Presentations

i. 船木亮平，高木 英行，中川尚志，永田里恵，松本希 (2014)．対話型差分進化ベースの動作姿勢生成支援システム，第 6 回進化計算学会進化計算研究会.

ii. 波多晃一，高木英行 (2013)．対話型差分進化ベースの動作姿勢生成支援システム，第 15 回日本知能情報ファジィ学会，九州支部学術講演会.

iii. 裴岩，高木英行 (2013). Method for determining search states of Markov Chain practically and its application to predict EC convergence and proof it, 2013 進化計算シンポジウム.

3. 上田 和夫 研究室 Kazuo UEDA

(a) 英語学術論文・出版物 English Publication

i. Hasuo, E., Nakajima, Y., Tomimatsu, E., Grondin, S., and Ueda, K. (2014). The occurrence of the filled duration illusion: A comparison of the method of adjustment with the method of magnitude estimation, *Acta Psychologica*, 147, 111-121.

(b) 日本語学術論文・出版物 Japanese Publications

i. 中島祥好，佐々木隆之，上田和夫，レメイン，G. B.（2014）．聴覚の文法，本文 159 ページ，コロナ社.

ii. 上田和夫（訳）(2013). 無関連音効果の音響心理学（全訳）, 日本音響学会誌, 69, 638-646. [Ellermeier, W. and Zimmer, K. (2014). The psychoacoustics of the irrelevant sound effect: A review, *Acoustical Science and Technology*, 35, 10-16.]

(c) 国際会議発表 International Conference Presentations

i. Isaji, S., Ueda, K., and Nakajima, Y. (2013). Effects of frequency-band elimination on identification of noise-vocoded Japanese syllables, *The 18th Auditory Research Forum*, Kitakomatsu, Japan.

ii. Ueda, K., Nakajima, Y., and Fujioka, T. (2013). Factor analyses of power fluctuations in spoken sentences: applying cepstral analyses, *The 18th Auditory Research Forum*, Kitakomatsu, Japan.

iii. Kishida, T., Nakajima, Y., and Ueda, K. (2013). Effects of elimination of power-fluctuation factors from critical-band noise-vocoded speech, *The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

iv. Ueda, K., Nakajima, Y., and Fujioka, T. (2013). Factor analyses of power fluctuations in spoken sentences of eight languages: Analyses of individual data, *The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

v. Hasuo, E., Nakajima, Y., Kishida, T., Tomimatsu, E., Ueda, K., and Grondin, S. (2013). The filled duration illusion with the method of adjustment when filled vs. empty comparison intervals are used, *The 29th Annual Meeting of the International Society for Psychophysics*, Freiburg, Germany.

vi. Kishida, T., Nakajima, Y., Ueda, K., Remijn, G. B., and Fujioka, T. (2013). Perceptual roles of power-fluctuation factors of speech sound revealed by cepstral liftering and zero-shifted factor analysis, *The 22nd Virtual Reality Psychology International Conference*, Fukuoka, Japan.

vii. Ueda, K., Nakajima, Y., Doumoto, K., Ellermeier, W., and Kattner, F. (2013). Disruptive effect of unattended noise-vocoded speech on recall of visually presented digits: interaction between the number of frequency bands and languages, *21st International Congress on Acoustics 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

viii. Nakajima, Y., Ueda,K., Fujimaru, S., and Ohsaka, Y. (2013). Sonority in British English *21st International Congress on Acoustics, 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

ix. Li, F., Nakajima, Y., and Ueda, K. (2013). Influence of duration on the perception of consonants /x/ and /j/ in Chinese, *21st International Congress on Acoustics, 165th Meeting of the Acoustical Society of America, 52nd Meeting of the Canadian Acoustical Association*, Montréal, Canada.

x. Ueda, K., and Nakajima, Y. (2013). Comparison of factors extracted from power fluctuations in critical-band-filtered homophonic choral music, *Auditory Resarch Meeting, the Acoustical Society of Japan*, Kyotanabe, Japan.

(d) 国内学会発表，研究会等 Domestic Conference Presentations

i. 上田和夫，中島祥好，佐々木隆之，レメイン，G. B. (2014). 聴覚の文法：音声知覚への応用, 日本音響学会春季研究発表会.

ii. 中島祥好，佐々木隆之，上田和夫，レメイン，G. B. (2014). 聴覚の文法, 日本音響学会春季研究発表会.

iii. 伊佐次伸也，上田和夫，中島祥好 (2014). 複数の周波数帯域の除去が雑音駆動音声の知覚に与える影響, 日本音響学会聴覚研究会.

iv. 野口聖人，上田和夫，中島祥好 (2014). 臨界帯域フィルターを用いた音声の因子分析:通常発声とささやき声, 日本音響学会聴覚研究会.

(e) 受賞 Award

i. 社団法人日本音響学会九州支部，学生表彰，2014 年 3 月 29 日. 伊佐次伸也, 上田和夫, 中島祥好 (2014). 複数の周波数帯域の除去が雑音駆動音声の知覚に与える影響, 日本音響学会聴覚研究会資料，Vol. 44, No. 1, H-2014-9, pp. 45-51.

4. 鏑木 時彦 研究室 Tokihiko KABURAGI

(a) 英語学術論文・出版物 English Publications

i. Kaburagi, T. (2014). Determining the length and cross-sectional area of the vocal tract jointly from formants using acoustic sensitivity function, *Acoustical Science and Technology*（印刷中）.

ii. Kaburagi, T., Takano, T., and Sakamoto, Y. (2013). Estimating area function of the vocal tract from formants using a sensitivity function and least-squares, *Acoustical Science and Technology*, 34, 5, 301-310.

(b) 国際会議発表 International Conference Presentations

i. Kaburagi, T., Yamada, N., Fukui, T., and Minamiya, E. (2013). A morphological and acoustic study on the effect of a trumpet player's vocal tract, *ICA 2013*.

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(c) 国内学会発表，研究会等 Domestic Conference Presentations

i. 内田秀継，若宮 幸平，鏑木 時彦 (2013)．3 次元磁気センサシステムにおける送信コイル配置の検討と精度評価，日本音響学会秋季研究発表会.

ii. 上江洲安史， 松田祥弘，鏑木 時彦 (2013)．外部音響駆動によるフォルマント周波数の測定, 日本音響学会，秋季研究発表会.

iii. 鏑木時彦 (2013)．対数断面積をパラメータとする音声からの声道形状の推定, 日本音響学会，秋季研究発表会.

iv. 内田秀継，若宮幸平，鏑木時彦 (2013)．三次元磁気センサシステムにおける送信コイルの配置の最適化についての検討，日本音響学会音声研究会.

v. 上江洲安史，松田祥弘，鏑木時彦 (2013)．外部音響励振法を用いた声道特性の測定に関する検討，日本音響学会音声研究会.

vi. 鏑木時彦 (2014)．感度関数を用いた音声スペクトルからの声道形状の推定，日本音響学会，春季研究発表会.

5. 上岡 玲子 研究室 Ryoko UEOKA

(a) 国際会議発表 International Conference Presentations

i. Kikuchi, Y., and Ueoka, R. (2014). Velvety massage interface (VMI): tactile massage system applied velvet hand illusion, *8th International Conference on Tangible, Embedded and Embodied Interaction (TEI 2014)*.

ii. Ishigaki, K., and Ueoka, R. (2014). Development of tactile biofeedback system for amplifying horror experience, *Augmented Human 2014*.

iii. Ishimatsu, H., and Ryoko Ueoka. (2014). BITAIKA: development of self posture adjustment system, *Augmented Human 2014*.

iv. Omori, N., Tsutsui, M., and Ueoka, R. (2013). A method of viewing 3D horror contents to amplify horror experience, *HCI (Human-Computer Interaction) 2013 International*.

(b) 国内学会発表，研究会等 Domestic Conference Presentations

i. 山本修平，上岡玲子 (2014)．空気砲を応用した「えあむすび」の製作，インタラクション 2014.

ii. 上岡玲子，山本修平，山口真美 (2013)．圧縮空気の顔面触覚ディスプレイとしての可能性，HCG シンポジウム 2013.

iii. 山本修平，上岡玲子 (2013)．空気砲を活用した「インタラクティブお参りシステム」，HCG シンポジウム 2013.

iv. 山口真美，山本修平，上岡玲子 (2013)．空気砲触覚による生理状態制御のための基礎的研究—Puff・Puff System：ユーザに寄り添う空気玉システム，電子情報通信学会.

(c) 特許等 Patent

i. 位置検知システム及びそれに用いる位置検知用シート体 (2013)．発明者：増田敦士，村上哲彦，上岡怜子，廣瀬通孝，特許第 5386713 号.

(d) 受賞 Award

i. HCG オーガナイズドセッション賞，2013 年 12 月．山本修平，上岡玲子 (2013)．空気砲を活用した「インタラクティブお参りシステム」, HCG シンポジウム 2013.

6. 妹尾 武治 研究室 Takeharu SENO

(a) 英語学術論文・出版物 English Publications

i. Seno T., Kitaoka, A., and Palmisano, S. (2013). Vection induced by illusory motion in a stationary image, *Perception*, 42, 1001-1005.

ii. Seno, T., and Nakamura, S. (2013). Alcohol consumption enhances vection, *Perception*, 42, 580-582.

iii. Wexler, M., Glennerster, A., Cavanagh, P., Ito, H., and Seno, T. (2013). Default perception of high speed motion, *Proceedings of the National Academy of Sciences*, 110, 17, 7080-7085.

iv. Seno, T., Palmisano, S., Ito, H., and Sunaga, S. (2013). Perceived gravitoinertial force during vection, *Aviation, Space and Environmental Medicine*, 84, 971-974.

v. Seno, T., Funatsu, F., and Palmisano, S. (2013). Virtual swimming? Breaststroke body movements facilitate vection, *Multisensory Research*, 26.

(b) 国際会議発表 International Conference Presentations

i. Seno, T. (2013). Opening remarks and an introduction to vection. *The 22nd Virtual Reality Psychology International Conference*.

ii. Seno, T. (2013). Stimulus meaning alters vection strength, *The 22nd Virtual Reality Psychology International Conference*.

iii. Seno, T. (2013). No sex difference in vection, *European Conference on Visual Perception 2013*.

iv. Ogawa, M., Seno, T., Ito, H., and Sunaga, S. (2013). Time course of attentional shift in response to another person's gaze direction, *European Conference on Visual Perception 2013*.

v. Ohtsuka, S., Takeichi, M., and Seno, T. (2013). Effect of color and color-word cues on the following color-word discrimination task: aging study, *European Conference on Visual Perception 2013*.

vi. Nakashima, W., Sunaga, S., Seno, T., and Oi, N. (2013). Investigation of spectral power distributions of LED light sources to provide preferred colors of natural objects, *12th International AIC Colour Congress*.

(c) 国内学会発表，研究会等 Domestic Conference Presentations

i. 本井碧, 西村貴孝, 妹尾武治, 綿貫茂喜 (2013). 低圧低酸素環境におけるベクションの抑制, 第 22 回 VR 心理学研究委員会.

ii. 中島航, 須長正治, 妹尾武治, 大井尚行 (2013). 自然物を好ましくみせる LED 照明の分光分布の検討, 日本色彩学会第 44 回全国大会.

7. 志堂寺 和則 研究室 Kazunori SHIDOJI

(a) 英語学術論文・出版物 English Publication

i. Utsumi, A., Tada, M., Yamamoto, N., Matsuo, N., Torii, T., and Shidoji, K. (2013). Active safety with enhanced communication among traffic participants, *IEEE ITSC2013*.

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