# Workshop 1: Theoretical Linguistics/Biolinguistics

**Organized by:** Roger Martin & Koji Fujita Lecture Room 1

Biolinguistics is a highly interdisciplinary study (including, at least, linguistics, biology, neuroscience, psychology, computer science, mathematics, and physics) that focuses on the biological and evolutionary aspects of language. At the center of this research stage have been the two so-called logical problems: of language acquisition, often referred to as Plato's problem (how could something like knowledge of language emerge in the mind of an individual, during early stages of childhood, and given what little relevant experience the child is exposed to?) and of language evolution, or what some might like to call Darwin's problem (namely, how could an object such as the human language faculty have evolved?). These issues of course line themselves up with a wide range of additional biolinguistic questions, concerning where and how language is represented in the brain, how language interacts with other human mental faculties, components of the mind/brain, and so on.

Needless to say, to address any of these concerns presupposes some understanding of what sort of natural object language is. That is, we need some theory of language - and for this obvious reason theoretical linguistics has always gone hand in hand with biolinguistic pursuits, often playing a guiding role. Recent developments in theoretical linguistics, particularly within the minimalist program (Chomsky 1995, et. seq.) with its focus on so-called third factors, have served to (re)fuel the biolinguistic enterprise, and have led to a wide range of new perspectives on the design of the human language faculty and its evolution.

The purpose of this workshop is to bring together researchers working on the sorts of general concerns briefly described. The six invited speakers (there will be a total of five talks including one joint presentation) are leading scholars of theoretical linguistics whose work is highly related to the biolinguistic enterprise. Topics addressed include, very generally, the form of language, problems of language acquisition, the nature of parameters, the interplay of linguistic theories and evolutionary theories, the relation between the language faculty and other human cognitive faculties, and so on. Some talks will deal more directly with biolinguistic issues, whereas others will focus more on the form/properties of language itself, laying some of the groundwork for studies of the former type. One of our main goals with this workshop is for it to serve as a meeting ground for scholars pursuing what is ultimately a biolinguistic approach to the study of language, although perhaps from different perspectives. All speakers were

asked to submit abstracts of their talks, either short (up to 2 pages) or long (up to 10 pages), which are included in the following section.

## Acknowledgements

This workshop is supported by the following JSPS Grants-in-Aid for Scientific Research: #23520458 [PI: Roger Martin] and #23242025 [PI: Koji Fujita].

## Workshop Timetable

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|---|---|
| 9.15 – 9.30 | Opening Remarks<br>*Koji Fujita (Kyoto University)* |
| 9.30 – 10.00 | Invited talk: Subject-auxiliary inversion in child English revisited<br>*Koji Sugisaki (Mie University)* |
| 10.00 – 10.50 | Invited talk: Structuring the parametric space without assuming an overspecified UG<br>*Cedric Boeckx (ICREA/Universitat de Barcelona), Youngmi Jeong (Universitat Autònoma de Barcelona)* |
| | Coffee Break |
| 11.10 – 12.00 | Invited talk: The design features from which signs and recursion emerged in language<br>*Denis Bouchard (Université du Québec à Montréal)* |
| 12.00 – 13.30 | Lunch Break |
| 13.30 – 14.20 | Invited talk: Copies as inert elements<br>*Ángel Gallego (Universitat Autònoma de Barcelona)* |
| | Coffee Break |
| 14.40 – 15.30 | Invited talk: Biolinguistics, minimalist grammars, and the emergence of complex numerals<br>*Anna Maria Di Sciullo (Université du Québec à Montréal)* |
| 15.30 – 15.45 | Closing Remarks<br>*Roger Martin (Yokohama National University)* |

# Workshop 2: Language and the Brain

**Organized by:** Noriaki Yusa & Hajime Ono Lecture Room 2

Language makes us what we are. In this respect, the first decade of the 21st century saw an exponential increase in empirical and theoretical studies that are leading to a watershed in our understanding of the differences between human and non-human communication systems. This workshop is intended as an interdisciplinary platform for discussing the recent results that research into the brain and language have provided, bringing together linguists, neuroscientists, philosophers, cognitive scientists, as well as other researchers interested in the neurobiology of language. Given the fact that the evolution of language remains shrouded in mystery, the question of how languages are encoded or processed in the brain will be raised as a central topic. The scope of the workshop includes, but is not limited to, the following areas: aphasics, imaging language in the brain, language acquisition and development, language disorder, language processing, language and cognition, mirror neurons, social cognition. Brain scientists, psychologists, linguists, neuroscientists, computer scientists, philosophers, and other researchers interested in interdisciplinary research on neurobiological mechanisms underlying human language are invited to participate in the workshop.

## Acknowledgements

This workshop has been supported by JSPS Grants-in-Aid for Scientific Research #21320078 [PI: Noriaki Yusa] and #23242025 [PI:Koji Fujita].

# Workshop Timetable

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|---|---|
| 9.15 – 9.20 | Welcome<br>*Noriaki Yusa (Miyagi Gakuin Women's University)* |
| | Chair: *Hajime Ono (Kinki University)* |
| 9.20 – 9.50 | A Cohort Study on Child Language Acquisition and Brain Development<br>*Hiroko Hagiwara (Tokyo Metropolitan University)* |
| 9.50 – 10.20 | Structure Dependence in the Brain<br>*Noriaki Yusa (Miyagi Gakuin Women's University)* |
| | Coffee Break |
| | Chair: *Noriaki Yusa (Miyagi Gakuin Women's University)* |
| 10.30 – 11.30 | Invited talk: Imaging Syntax and Semantics in the Brain<br>*Stefano F. Cappa (Vita-Salute University and San Raffaele Scientific Institute)* |
| 11.30 – 12.50 | Lunch Break |
| | Chair: *Hisao Tokizaki (Sapporo University)* |
| 12.50 – 13.20 | Recursion in Intra-Morphemic Phonology<br>*Kuniya Nasukawa (Tohoku Gakuin University)* |
| 13.20 – 13.50 | Implications of Tonogenesis on Tone Processing<br>*Suki Suet Yee Yiu (University of Hong Kong)* |
| | Chair: *Hirohisa Kiguchi (Miyagi Gakuin Women's University)* |
| 13.50 – 14.20 | Against Protolanguage<br>*Ermenegildo Bidese (University of Trento), Andrea Padovan (University of Verona) and Alessandra Tomaselli (University of Verona)* |
| | Coffee Break |
| | Chair: *Toshio Inui (Kyoto University)* |
| 14.35 – 15.35 | Invited talk: Evolving the Direct Path in Praxis as a Bridge to Duality of Patterning in Language<br>*Michael A. Arbib (University of Southern California)* |
| 15.35 – 15.40 | Concluding Remarks<br>*Hajime Ono (Kinki University)* |

# Workshop 3: Emotion and Language

**Organized by:** Tomomi Fujimura Seminar Rooms 2–4

Emotion is conveyed by language (i.e. during emotional episodes), but at the same time language is modified by emotion (i.e. through prosody). So while both emotion and language are essential aspects of communication, the importance of their interactions should also not be overlooked. Currently however, details of this interaction remains somewhat unclear, and it is this issue which this workshop seeks to address. Taking a multidisciplinary perspective, the workshop presents recent work in linguistics, acoustic engineering, psychology, and developmental studies.

Human language explicitly conveys intentions and thoughts, whereas emotion implicitly conveys information about subjective states. The first direction of interaction is thus exemplified by an utterances such as I agree, to understand it you must infer the speaker's authentic attitude from an analysis of his/her prosody, facial expression, and gestures, all of which are expressing emotional information. In such situations we are using both linguistic and emotional information to understand others' internal states. An understanding of the integration of emotion and language in perceptual processing is thus essential to understanding the process of communication more generally. This issue will be discussed during the workshop based on the data from perception experiments and developmental studies.

In the opposite direction, external emotion representations are also partly defined by language. Humans use words to express emotional states, i.e., anger, happiness, and sadness. Language can help to separate, and understand, certain complex emotions expressed during communication. However, recent work has reported that perception of emotional facial expressions is not driven by lexical categories, which indicates that while emotion representation is influenced by language, it is not totally dependent on it. Several talks will address the various ways in which linguistic information defines emotional concepts.

It is hoped that the approaches presented in this workshop will provide a framework for future work on emotion and language.

## Acknowledgements

This workshop is supported by Japan Science and Technology Agency (JST), Exploratory Research for Advanced Technology (ERATO), Okanoya Emotional Information Project.

# Workshop Timetable

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|---|---|
| 9.40 – 9.50 | Welcome<br>*Tomomi Fujimura (JST-ERATO Okanoya Emotional Information Project)* |
| 9.50 – 10.35 | Invited talk: Competition in the acoustic encoding of emotional speech<br>*Frank Eisner (Max Planck Institute for Psycholinguistics)* |
| 10.35 – 11.00 | Dimensional modeling of perceptual difference of multimodal emotion perception<br>*Yoshiko Arimoto (JST-ERATO Okanoya Emotional Information Project), Kazuo Okanoya (The University of Tokyo)* |
| 11.00 – 11.25 | Cerebral responses to emotional and prosodic modifications of speech in human full-term neonates and preterm infants<br>*Nozomi Naoi (JST-ERATO Okanoya Emotional Information Project), Yutaka Fuchino, Minoru Shibata, Masahiko Kawai, Yukuo Konishi, Kazuo Okanoya, Masako Myowa-Yamakoshi* |
| | Lunch Break |
| 12.30 – 13.15 | Invited talk: Concepts and perception of emotions in the absence of a lexical emotion category<br>*Disa Sauter (University of Amsterdam)* |
| 13.15 – | Mixed feelings and emotion clusters in the dynamics of verbal interaction<br>*Barbara Lewandowska-Tomaszczyk (University of Łódź)* |
| – 13.50 | The influence of emotion and approach-avoidance motivation on the production and understanding of metaphor<br>*Paul Wilson (University of Łódź) – presented by Barbara Lewandowska-Tomaszczyk (University of Łódź)* |
| | Coffee Break |
| 14.00 – 14.25 | Language in music: The emotional valence in low arousal music are susceptible to language<br>*Kazuma Mori (Hiroshima University), Makoto Iwanaga (Hiroshima University)* |
| 14.25 – 14.40 | Question & Answer<br>*All presenters* |

# Workshop 4: Animal Communication and Language Evolution

**Organized by:** Johan Bolhuis & Kazuo Okanoya Lecture Room 3

It has often been suggested that language is a uniquely human cognitive trait. But this uniqueness does not preclude that there may be evolutionary homologies or analogies between human speech and certain aspects of animal communication systems, at either the neural or behavioral level. Therefore through the comparative study of animal vocalizations and human speech, we may gain insights into the origin and evolution of language.

Neural control and evolution of song sequences and vocal learning in birds will be one of the main topics in this workshop. Language and birdsong are obviously different in that language has lexical syntax, while birdsong does not. However, the basic neural architecture for auditory-vocal learning may be shared in both birds and humans. We will discuss common and unique features of birdsong and human speech.

Apart from birdsong learning, this workshops is open to research on other animal taxa and in other modalities, as long as a comparative perspective with human speech or language is provided. We particularly welcome presentations on gestural/vocal communication, social behavior. Topics on theory of mind, counting, and tool-using, thought not directly related with communication, are also considered as a comparative biological basis for language.

## Acknowledgements

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## Workshop Timetable

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|---|---|
| 9.45 – 10.00 | Welcome<br>*Johan Bolhuis (Utrecht University) & Kazuo Okanoya (University of Tokyo)* |
| | Part I. Theoretical Studies |
| 10.00 – 10.25 | Language and animal communication: The evolutionary and cognitive divide<br>*Charles N. Li (University of California)* |
| 10.25 – 10.50 | Can evidence of a discontinuity in the evolution of language be found in a comparative study of animal signalling?<br>*Dominic Mitchell (University of Bath)* |
| 10.50 – 11.15 | Statistical patterns of human language in other species: Facts, origins and controversies<br>*Ramon Ferrer-i-Cancho (Universitat Politècnica de Catalunya)* |
| | Part II. Experimental studies |
| 11.15 – 12.00 | Invited talk: Birdsong and spoken language: Similarities and differences<br>*Johan J. Bolhuis (Utrecht University)* |
| 12.00 – 13.20 | Lunch Break |
| 13.20 – 13.45 | Abstract rule learning in human and non-human animals<br>*Reiko Hoshi-Shiba (University of Tokyo), Fang Sun, Kenta Suzuki, Dilshat Abla, Kazuo Okanoya* |
| 13.45 – 14.10 | Combinational vocal usage for emotional expression in common marmoset (Callithrix jacchus)<br>*Yoko Kato (National institute of radiological sciences), Hayato Gokan, Arata Oh-Nishi, Takafumi Minamimoto* |
| 14.10 – 14.55 | Invited talk: Vocal deviance detection in auditory cortex of a social songbird<br>*Gabriël Beckers, Manfred Gahr* |
| | Break |
| 15.00 – 15.30 | General Discussion<br>*All participants* |

# Workshop 5: Constructive Approaches to Language Evolution

**Organized by:** Reiji Suzuki & Takashi Hashimoto Lecture Room 4

Constructive approaches, that is modeling, simulation and analysis of emergent phenomena by synthesizing life-like behaviors using artificial media such as computers, robots, etc., have played a significant role in the development of our understanding of the origin and evolution of language over the last two decades. They have allowed us to observe the emergence of linguistic behaviors from communicative interactions between agents, on various levels and timescales, which are not easily observable experimentally.

During this period, several other methodologies have also emerged, which have allowed us to obtain empirical data with regard to language evolution. Experimental approaches to the cultural evolution of language have enabled us to directly observe the emergence of new languages or grammars in use by human participants. The recent progress of new media or information technologies has also allowed us to discover real language changes by analyzing huge linguistic resources, such as google books, etc. Comparative approaches based on data from non-human animal species, such as vocal learning of songbirds, is becoming increasingly significant. In addition, mathematical approaches have contributed to a better understanding of essential aspects of computational models, such as the iterated learning model, etc.

In the light of these recent developments, and progress of interdisciplinary approaches to understanding language evolution, we would like to reconsider the significance of constructive approaches such as computational and mathematical modeling in this workshop. We solicited the submission of papers on language evolution making use of constructive approaches, and invited two speakers to give talks on the significance of these approaches. The authors were requested to make specific mention of how constructive approach can contribute to research on language evolution.

Topics of interest to this workshop include, but are not limited to:

- Simulation and analyses of emergent properties of language evolution based on constructive approaches, including computational and mathematical models.
- How constructive approaches can develop a mutually complementary relationship with other methodologies for investigating language evolution.
- More general discussions of the roles of constructive approaches in scientific research, including language evolution.

# Workshop Timetable

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|---|---|
| 9.35 – 9.40 | Welcome<br>*Reiji Suzuki (Nagoya University)* |
| 9.40 – 10.20 | Invited talk: Modelling and language evolution: beyond fact-free science<br>*Bart de Boer (Vrije Universiteit Brussel)* |
| | Coffee Break |
| 10.30 – 10.55 | Evolution of word frequency distribution based on prediction dynamics<br>*Kazutoshi Sasahara (University of Tokyo)* |
| 10.55 – 11.20 | A simple model on the evolution process of herbivore-induced plant volatiles<br>*Yasuhiro Suzuki (Nagoya University), Megumi Sakai (Nagoya University) and Kazuhiro Adachi (Nagoya University)* |
| 11.20 – 11.45 | Reconsidering language evolution from coevolution of learning and niche construction using a concept of dynamic fitness landscape<br>*Reiji Suzuki (Nagoya University) and Takaya Arita (Nagoya University)* |
| | Lunch Break |
| 13.10 – 13.40 | Plenary talk: Integrative approach to dynamic feature of symbolic communication system<br>*Takashi Hashimoto (JAIST)* |
| | Coffee Break |
| 13.50 – 14.15 | Synthetic modeling of cultural language evolution<br>*Michael Spranger (Sony CSL Paris) and Luc Steels (Sony CSL Paris)* |
| 14.15 – 14.40 | Language diversity in the naming game on adaptive weighted networks<br>*Dorota Lipowska (Adam Mickiewicz University)* |
| 14.40 – 15.05 | Multilayered formalisms for language contact<br>*Makoto Nakamura (Nagoya University), Shingo Hagiwara (JAIST) and Satoshi Tojo (JAIST)* |
| 15.05 – 15.25 | Constructing knowledge: nomothetic approaches to language evolution<br>*Seán G. Roberts (The University of Edinburgh) and James Winters (Cardiff University)* |