



Evolinguistics

東京共創言語進化学講座

Tokyo Lectures in Evolinguistics 2019



March 11-13, 2019

**Lecture Hall, 21 KOMCEE West B1F
U Tokyo, Komaba I Campus**

- Day-1: March 11 Mon 13:30~17:20 Lectures <Lecture Hall>

17:20~20:00 Poster Session · Banquet <MM Hall>

18:00~19:00 Poster Presentation – Group I
19:00~20:00 Poster Presentation – Group II
- Day-2: March 12 Tue 09:00~17:30 Lectures <Lecture Hall>
- Day-3: March 13 Wed 09:00~12:45 <Lecture Hall>

関連イベント 参加費無料／登録不要(使用言語は英語です)

3月15日(金) **京都共創言語進化学講座** 京都大学 芝蘭会館別館 研修室 I

13:30~17:30

Kyoto Lectures in Evolinguistics 2019

Lecture 1: **Network-based approaches to vocal learning** Stephanie White (UCLA)

Lecture 2: **How transmission and interaction create and destroy linguistic structure** Kenny Smith (University of Edinburgh)

Lecture 3: **Syntax in the light of evolution: Intermediate stepping stones toward hierarchy, Move, and recursion** Ljiljana Progovac (Wayne State University)

Day-1: March 11 Mon

13:30-13:40 **Opening Remarks**

Kazuo Okanoya, The University of Tokyo

13:40-15:20 **Generative grammar, cognitive linguistics, and language evolution (生成文法・認知言語学と言語進化)**



Koji Fujita, Kyoto University · Kazumi Taniguchi, Kyoto University

This lecture is designed as an introduction to generative grammar and cognitive linguistics as theoretical backgrounds for our Evolving linguistics project. We review basic concepts and ideas of these frameworks with a special focus on language evolution. As it stands, the strong opposition between GG and CL is often harmful to a better understanding of how human language first came into being in the species (biological evolution) and developed later in different societies (cultural evolution). We will clarify some advantages and disadvantages of each position and discuss some possible forms of unifying their good insights with other relevant fields to construct an integrative scenario of language evolution. (For the most part, this lecture is given in Japanese.)



15:20-15:40 Break

15:40-17:00 **Emergent constructive approach to evolving linguistics (共創言語進化への創発構成論アプローチ)**



Takashi Hashimoto, Japan Advanced Institute of Science and Technology

The origin of language is characterized by the biological evolution of abilities related to language and communication, and the evolution of language by the structuralization and complexification of language knowledge as well as communication systems through cultural evolution. In this lecture, I will introduce emergent constructive approach to the origins and evolution of language. This approach is a methodology to analyze complex phenomena by constructing and operating the evolutionary and emergent processes of objective phenomena. Two idiosyncrasies of human linguistic communication will be the primary focus as Evolving linguistics, namely, using hierarchically organized symbol sequences in language and sharing intentions in symbolic communication. The integration of these two characteristics is considered to make humans co-creative.

17:00-17:20 Break

17:20-20:00 **Poster session + Banquet (in MM Hall) ポスターセッション+立食懇談会**

Poster presenters

Posters will be allotted in two groups. Presenting authors are expected to stand by their posters during the allotted core time.

- Group-I (Posters odd-numbered) core time : 18:00-19:00
- Group-II (Posters even-numbered) core time: 19:00-20:00

MM Hall is available till 19:00, March 12th, for presenters who want to keep their posters mounted on poster panels but should be removed at 19:00 latest.

Poster awards will be given to the most outstanding poster presenters, being selected by the Evolving linguistics team leaders. Ceremony will be held from 12:30 on March 13th in Lecture Hall.

Day-2: March 12 Tue

09:00-10:20 **Biological pre-adaptations to language (言語への生物学的前適応)**



Kazuo Okanoya, The University of Tokyo

Language divides humans from other animals. Yet, language is a property shaped by evolution. Language enables transmission and accumulation of knowledge and technology. And these established the special niche of humans on the earth. We need to explain the discontinuity based on the continuity of evolution. In this lecture, I consider biological pre-adaptations that resulted in the emergence of language, and evolutionary driving forces that pushed the process of emergence. As pre-adaptations, I consider vocal plasticity, behavioral segmentation, and contextual segmentation. As driving forces, I discuss sexual selection and domestication. I will use examples from various animal behaviors, including bird song, mice song, gibbon song, rat spatial navigation, and proto-compositional use of calls in some monkeys and birds. I present possible scenarios that can explain the emergence of language based on these biological considerations.

10:20-10:40 Break

10:40-12:00 **When and why language emerged? (いつ、なぜ言語は出現したのか)**



Yasuo Ihara, The University of Tokyo

Language is perhaps the most conspicuous human trait that makes us consider ourselves different from all other animals. For a better understanding of the evolution of language, it is essential to narrow down possible timings for the emergence of the human language faculty, or its functional constituents, on the history of human evolution. Also of importance is to specify the ecological context within which each of these functional designs was favored by natural selection. As part of our Evolving linguistics project, we have launched our endeavor to integrate knowledge from physical anthropology, archaeology, primatology, and evolutionary theory to explore the historical and ecological aspects of human language evolution. This lecture will outline our perspectives and recent developments.

12:00-13:30 Lunch Break

13:30-15:20 **Language learning, language use, and the evolution of linguistic structure**



Kenny Smith, The University of Edinburgh

When we look across the languages of the world, we see that they all share the same fundamental set of structural features that give language its open-ended expressive power. Those universal structural features of language presumably reflect properties of the way in which humans learn language, which may in turn be shaped by our genes. But language is not necessarily a direct reflection of properties of individual learners: languages persist in populations via a repeated cycle of learning and use, where learners learn a language by observing the communicative behavior of other individuals who learnt their language in the same way. Languages evolve as a result of this cycle of learning and use, and are therefore the product of a potentially complex interplay between the biases of human language learners, the communicative functions which language serves, and the ways in which languages are transmitted in populations. In this talk I will present a series of experiments, based around artificial language learning, dyadic interaction and iterated learning paradigms, which allow us to explore the relationship between learning and use in shaping linguistic structure; I will finish with an experimental study in non-human primates, which suggests that systematic structure may be an inevitable outcome of this cycle of learning and use, rather than a reflection of uniquely human learning capacities.

Professor, Centre for Language Evolution, Linguistics and English Language, School of Philosophy, Psychology and Language Sciences, The University of Edinburgh

Publications

The cognitive roots of regularization in language

Ferdinand, V., Kirby, S. & Smith, K. Mar 2019 In : *Cognition*. 184, p. 53-68

Children's sensitivity to phonological and semantic cues during noun class learning: Evidence for a phonological bias

Culbertson, J., Jarvinen, H., Haggarty, F. & Smith, K. 17 Dec 2018 (Accepted/In press) In : *Language*.

Social group effects on the emergence of communicative conventions and language complexity

Atkinson, M., Mills, G. & Smith, K. 30 Oct 2018 In : *Journal of Language Evolution*.

15:20-15:40 Break

15:40-17:30 **What use is half a sentence? Grammar caught in the act of natural/sexual selection**



Ljiljana Progovac, Wayne State University

This lecture focuses on the evolution of grammar, advocating a gradual emergence of hierarchical structure and transitivity, as subject not only to cultural innovation, but also to natural/sexual selection forces. I present a precise linguistic reconstruction of the initial, proto-grammar stage, characterized as an intransitive, flat, two-slot mold, unable to distinguish subjects from objects. Even this crude grammar offers clear and substantial communicative benefits over no grammar at all, as well as reveals, through its limits, reasons and rationale for evolving more complex grammars. The particular uses to which this proto-grammar can be put even today (e.g. insult: cry-baby; naming: rattle-snake; proverbial wisdoms: Monkey see, monkey do; Like father, like son) reveals why this cultural invention (of coining binary combinations) would have been highly adaptive at the dawn of language. With the goal to shed concrete light on how biological evolution may have begun to shape the genetic make-up that supports human language, a specific sexual selection scenario will be considered. By identifying insult (verbal aggression) as relevant for early language evolution, this proposal also meaningfully interacts with the recent proposals regarding human self-domestication.

Professor of Linguistics, College of Liberal Arts & Sciences, Wayne University

Publications

A Critical Introduction to Language Evolution (2019 e-book, Springer Expert Briefs)

Neural correlates of syntax and proto-syntax: Evolutionary dimension. Co-authors: Progovac, L.; Rakhlin, N.; Angell, W.; Liddane, R.; Tang, L.; and Ofen, N. *Frontiers in Psychology* 2018

Diversity of grammars and their diverging evolutionary and processing paths: Evidence from Functional MRI study of Serbian. Co-authors: Progovac, L.; Rakhlin, N.; Angell, W.; Liddane, R.; Tang, L.; and Ofen, N. *Frontiers in Psychology* 2018

Day-3: March 13 Wed

09:00-10:20 **Social-pragmatic approach to language development** (言語発達への社会語用論的アプローチ)



Harumi Kobayashi, Tokyo Denki University

We cannot look at how humans acquired language for the first time on this planet, but we CAN look at how humans acquire language for the first time in life. Exploring language development provides us a precious opportunity to examine possible mechanisms that promoted emergence of language. In developmental psychology, several approaches have been presented to account for mechanisms of language development. In this lecture, I will discuss three major approaches, constraint/bias approach, statistical learning approach, and social-pragmatic approach. Social-pragmatic approach focuses on humans' ability to infer other people's intention and tries to explain language development as a process of emerging skills of sharing intentionality. I will discuss the plausibility and advantages of the social-pragmatic approach from the viewpoint of Evolving linguistics.

10:20-10:40 Break

10:40-12:30 **Of speech and birdsong: Surprising similarities in brain circuits for vocal learning**



Stephanie White, University of California

Before they learn to sing, songbird nestlings, like human babies, cry for attention. Only through hours of practice during 'critical periods' do they develop a song suitable for courting mates. Language also blossoms during a critical period whose closure makes it difficult to speak a foreign tongue. Our research focuses on the FoxP2 transcription factor whose link to language is unprecedented: a single base mutation in the DNA-binding domain causes a human speech disorder with a Mendelian inheritance. What we learn about FoxP2 and other vocal-related molecules in birdsong may tell us how they affect speech. Remarkably, the act of morning singing reduces FoxP2 levels within song control cells of the avian striatum, along with coordinated changes in thousands of other genes. These changes occur in young and old birds. Changes unique to young birds may underlie critical period learning. We set out to identify how these gene co-expression patterns shift across the critical period boundary. In both young and old birds, we found patterns that were regulated by singing, >70% of which were subsequently found in human gene modules related to autism. We then found patterns that were tightly linked to learning in young birds but that were lost in old birds implicating them in critical period plasticity. Several of these learning-related genes are essential for language development. We capitalize on the robust brain-behavior relationships in songbirds to functionally test these relationships. Our work reinforces the convergent evolution of vocal learning systems in birds and humans.

Professor, Integrative Biology and Physiology, Brain Research Institute, UCLA

Publications

Burkett Z D, Day N F, Schwartz B A, Phelps P E, White S A Mice with Dab1 or Vldlr insufficiency exhibit abnormal neonatal vocalization patterns *Scientific reports*, 2016; 6(3): 25807.

Berg Jamee M, Lee Changhoon, Chen Leslie, Galvan Laurie, Cepeda Carlos, Chen Jane Y, Peñagarikano Olga, Stein Jason L, Li Alvin, Oguro-Ando Asami, Miller Jeremy A, Vashisht Ajay A, Starks Mary E, Kite Elyse P, Tam Eric, Gdalyahu Amos, Al-Sharif Noor B, Burkett Zachary D, White Stephanie A, Fears Scott C, Levine Michael S, Wohlschlegel James A, Geschwind Daniel H JAKMIP1, a Novel Regulator of Neuronal Translation, Modulates Synaptic Function and Autistic-like Behaviors in Mouse Neuron, 2015; 88(6): 1173-91.

Miller Julie E, Hafzalla George W, Burkett Zachary D, Fox Cynthia M, White Stephanie A Reduced vocal variability in a zebra finch model of dopamine depletion: implications for Parkinson disease *Physiological reports*, 2015; 3(11): .

12:30-12:45 **Poster Awards Ceremony / Closing Remarks** Kazuo Okanoya, U Tokyo

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