



Institut  
d'Estudis  
Catalans



Societat Catalana  
de **BIOLOGIA**



# NATURAL LANGUAGES AND COMMUNICATION IN BIOLOGY

June 29, 2023

Sala Prat de la Riba, IEC, Carrer del Carme, 47. Barcelona

## Organizer

JORDI GÓMEZ

Institute of Parasitology and Biomedicine “López-Neyra”, CSIC, Granada

## Scientific coordinators

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Andalusian Centre for Developmental Biology; Pablo Olavide University (CABD-UPO-CSIC); LifeHUB-CSIC Coordinator

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University of Barcelona and SCB Virology Section Coordinators

## SCB and Life-Hub CSIC Administrative support

ENCARNACIÓN CARRILLO

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## Objective

The main objective of the conference is to provide an introduction to a new field for most biologists. We intend to convey the meaning of the terms, concepts and basic contents of the philosophy of language and the theory of pragmatic communication applied to biology; as well as the path followed in the different levels of biological communication. To achieve this, we will have experts in different areas of natural language and biocommunication as well as experimental scientists.

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## Preliminary Program

**9.15-9.30** Introduction: Why hold this meeting? Conference organizers and heads of the molecular biology and virology sections.

### **9.30-10.50** **Session 1**

Basic terms, concepts and theories of interactions mediated by signs, as well as their limits.

An introduction to the concepts of the philosophy of language, semiotics and pragmatics, as well as how biosemiotics has found support in the umwelt concept of the father of ethology, Jakob Johann von Uexküll. The objective is to unite two separate fields: one theoretical of natural languages at different levels of biological complexity and the other of experimentation, in a more cohesive context of discussion that addresses the latest advances in both areas. An attempt will also be made to establish the minimum semiosis limits for phenomena that can be described physically and chemically.

**9.30-9.50** **A brief introduction to the philosophy of language: approaches and basic concepts**

ASTRID WAGNER, Institute of Philosophy, CSIC. Madrid. Centro de Investigación del Conocimiento. Berlin.

**9.50-10.10** **Current Biosemiotic Thinking on Scaffolding and Choice-Making**

CLAUDIO RODRÍGUEZ-HIGUERA, Palacký University Olomouc, Czech Republic

**10.10-10.30** **On the origins of biological information: 'dynamic decoupling' as an organizational principle connecting protocell physiology and evolution**

KEPA RUIZ-MIRAZO, Sciences faculty, University of the Basque Country

**10.30-10.50 Artificial Intuition and Language Models: How chatGPT learns human languages**

JULIO GONZALO, National Distance Education University (UNED)

**10.50-11.30 ☕ COFFEE BREAK**

**11.30-12.10 Session 2**

Concepts of language and communication applied to biology. The application of the concepts of language to everyday molecular biology depends on how they fit together to establish what is missing, especially in molecular biology, what Jacques Monod called "gratuity"; that is, that which is not determined by physics or chemistry. These are molecular processes that originate from one of the many possible alternatives that become a habit, i.e. the specific charge of tRNA with its related amino acids. This is the range that research has reached in what can be defined as minimal semiosis. We will be able to consider how semiosis is part of life itself, from "eusemiosis" to "protosemiosis" in living beings, with the construction of "pre-semiosis" in molecular blocks of life, making up the complex "biology of the code". Alternatively, meaning can simply be attributed to the molecular agents at play at any given moment. Thus, the social relationships of the molecular agents have become the focus of study; that is, the viruses and integrated viral agents that have played a key role in the evolution of higher organisms.

**11.30-11.50 Communication means Active Signal-Mediated Interaction (or: How to do Things with Signals)**

GÜNTHER WITZANY, Telos-Philosophische Praxis, Salzburg, Austria.

**11.50-12.10 Where are the basal semiotics in biology? Some notes about protosemiotics, cytosemiotics and physiosesemiosis.**

ÓSCAR CASTRO, Philosophy faculty, Autonomous University of Barcelona (UAB)

**12.10-14.30 🍽️ BUFFET LUNCH**

**14.30-16.10 Session 3**

Biology experiments treated with concepts of language and communication. This will include the application of semiotics, the biology of codes and pragmatic concepts in the interpretation of experimental results on prions and RNA interference in plants; the old paradoxes in the evolution of RNA viruses; the virus population as a decision-making model in evolution; and the hypothesis of viruses as signs.

**14.30-14.50 Quasispecies memory as an impulse for evolutionary decision-making**

ESTEBAN DOMINGO, The Centre for Molecular Biology “Severo Ochoa”, CSIC-UAM Cantoblanco, Madrid.

**14.50-15.10 Agency in evolution of biomolecular communication (Virtual presentation)**

GUSTAVO CAETANO ANOLLES, University of Illinois

**15.10-15.30 mRNA archaeology, concepts and examples**

JORDI GÓMEZ, Institute of Parasitology and Biomedicine “López-Neyra” (IPBLN) CSIC, Armilla, Granada.

**15.30-15.50 Molecular sociology interwoven with (bio/socio)semiotics: RNAi as a paradigmatic example**

JUAN COCA, Sociology, University of Valladolid.

**15.50-16.10 Toward an informational definition of phenotype**

FERNANDO CASARES, CABD (Andalusian Centre for Developmental Biology),CSIC-Universidad Pablo de Olavide

**16.10-16.50 ☕ COFFEE BREAK**

**16.50-18.30 Session 4**

A General Debate will be presided over by a group of 5 multidisciplinary researchers from LifeHUB-CSIC and SCB who will raise questions and provide the main conclusions of the day. It will act as a type of interface between the different disciplines and between the public and the speakers, to establish connections between theoretical concepts and advances in experimental biology.

**Round table members:**

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