



MEETING ON BIOLOGICAL LANGUAGES

On October 30th and 31st, 2025 we will hold a meeting at the Institute of Parasitology and Biomedicine (López-Neyra) in Granada, sponsored by the Life-Hub CSIC and the external seminar series of our Institute, focused on Biological Languages.

We will have the opportunity to explore, in a **didactic format**, an up-to-date perspective on **the relevance of human language and communication studies- throughout the 20th century** as well as the various ways they have found accommodation within theoretical and applied biology, and how they are beginning to influence experimental biology.

These theoretical and applied approaches to **signal-mediated interactions—understood as natural or biological languages**—are grounded, in one way or another, **on** each organism's (or cell's) unique perception of the world, shaped by its specific sensory capacities. They also consider that, to some extent, each organism integrates past experiences, including the genetic memory of its ancestors and cohabitants, which have influenced the development of both the individual and its community. Taken together, this implies that **the meaning of signal-mediated interactions is (inter)subjective in nature**.

This perspective has significant implications for how we understand biological codes (such as the genetic code), how signaling in organisms functions beyond the mechanistic and reductionist paradigms of the previous century, and how living systems organize and coordinate their functions through communication (signal-mediated interaction). It has already found applications in how we conceptualize the surfaces of organisms—as semi-autonomous communicative organs—as well as in our understanding of the pre-history of mRNAs and in modeling the organism's environment during development, role of repetitive RNA and DNA, non-coding RNA networks, mobile genetic elements, etc. **An effort will be made by experimental participants to highlight the central role of signal- and code-mediated communication in their studies.** We will explore these ideas across multiple levels of biology: molecular, cellular, organismal, and through theoretical modeling.

Throughout the meeting—and as is customary in the Life-Hub CSIC meetings—we will leave ample room for discussion, fostering an open and interdisciplinary exchange of ideas, and **actively develop the interface between theory and experimentation**, helping us better understand how to approach experimental design in light of the conceptual frameworks presented. The exchange of a limited selection of bibliography prior to the meeting is also proposed.

For this event, we have specialists in philosophy and theory, as well as some invited experimental speakers. However, we would like to encourage participation from researchers

at IPBLN, Life-Hub CSIC, and, more broadly, anyone interested in this novel topic. Therefore, the organization is open to considering your involvement.

Organizer: Jordi Gómez; Coorganizers: Günther Witzany, José Francisco Sánchez-Luque, Fernando Casares, Juan Poyatos; Administrative support: María Jesús Ojeda (IPBLN) and Antonella Lannini (CABD).

30-october

PART 1- Philosophy Theoretical Frameworks and Models. 30 mins

Session Chair: Guenther Witzany

15.00-16.30

- **Astrid Wagner** – *General Framework: Philosophy of Language*
Institute of Philosophy, CSIC (Spain)
- **Claudio J. Rodríguez** – *Biosemiotics*
Palacký University, Czech Republic
- **Gunther Witzany** – *Biocommunication*
Telos–Philosophische Praxis, Buermoos (Austria)

16.45-17.45

- **Robert Prinz** – *Biology of Codes*
(Germany Rechenkraft.net e.V., Marburg, Germany– participation via on-line)
- **Karel Kleisner** – *Inter-organism Communication and Semantic Organs*
Charles University, Czech Republic

PART-2 Experimental and Applied Perspectives. 10 min talks

Development, Organs, Cells

Session Chair: José Francisco Sanchez-Luque

17.45- 18.50

- **Fernando Casares** – *Communication in Developmental Biology*
Centro Andaluz de Biología del Desarrollo (CABD), CSIC/U.Pablo de Olavide. Sevilla. (Spain)
- **Juan Poyatos** – *Biological Language Models*
Museo Nacional de Ciencias Naturales, CSIC. Madrid. (Spain)
- **David Pozo Pérez** – *Immune–Nervous System Communication*
U. of Seville (Spain)
- **Juan Francisco López-Gimenez** – *Neuropsicofarmacology*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada. (Spain)
- **Belen Valenzuela** – *Modeling of contextualized perception* Instituto de Ciencia de Materiales de Madrid (CSIC). (Spain)

31-October

Development, Organs, Cells

Session Chair: Juan Poyatos

9.00-10.00

- **Luciano Marcón** – *Communication in developmental biology*
Centro Andaluz de Biología del Desarrollo (CABD), CSIC/U. Pablo de Olavide Sevilla (Spain)
- **Cristina Hernandez de Munain** – *Signals for cell lineage determination* Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Javier Oliver** – *Signalling in cancer*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Alicia G. Arroyo** – *Cellular communication in intravascular immunosurveillance*
Margarita Salas Center for Biological Research, CSIC. Granada (Spain)
- **Mario Delgado** – *Non-canonical signals to educate the immune system*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Julio Antonio Gonzalo** – *Natural Languages and Artificial Intelligence*
National Distance Education University (UNED), Madrid (Spain)

10.00-10.45 General Discussion

Coffee

Molecular biology and evolution

Session Chair: Fernando Casares

11.00-12.10

- **Kepa Ruiz-Mirazo** – *Natural symbols at the origins of life: constructing an individual architecture that enables collective, open-ended evolution*
U. of the Basque Country. Bilbao (Spain)
- **Jordi Gómez** – *Archaeology of mRNA codes*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Sara R Heras** – *Primate-specific RNA networks*
U.Granada/Genyo. (Spain)
- **José Francisco Sánchez-Luque** – *Mobile DNA editors*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Elena Gómez Díaz** – *Epigenetics and symbiosis.*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Manuel Daza** – *Repetitive DNA: the secret is in the sequence.*
Institute of Parasitology and Biomedicine "López-Neyra", CSIC. Granada (Spain)
- **Ricardo Arias** – *Stochastic Thermodynamics Protocols for Information in Biomolecular Systems.* U. Politécnica de Valencia (Spain)

12.10-13.00 General discussion Light lunch (IPBLN Hall)
Discussion/Conclusions

14.30-16.00 General