Professores e tópicos abordados

Programa de Formação em Biologia e Ecologia Quantitativas

Antonio Coutinho, Instituto Gulbenkian de Ciência

Antonio Coutinho is an immunologist with an extensive career and a comprehensive view of science and scientific thinking. In addition to leading groups and institutions in Sweden, Switzerland, and France, from 1998 to 2012 he directed the Instituto Gulbenkian de Ciência, in Portugal, considered one of the best research training centers in the world. **He will be teaching history of biological concepts.**

Oded Rechavi, Tel Aviv University

Oded Rechavi works on the transgenerational inheritance through epigenetic mechanism involving small RNAs. **He will be teaching about genetics, epigenetics, and large genetic datasets.**

Recent publications: *Three Rules Explain Transgenerational Small RNA Inheritance in C. elegans. Houri-Zeevi L et al. Cell. 2020; Neuronal Small RNAs Control Behavior Transgenerationally. Posner R et al. Cell. 2019; A Tunable Mechanism Determines the Duration of the Transgenerational Small RNA Inheritance in C. elegans. Houri-Ze'evi L et al. Cell. 2016.*

Hanna Kokko, University of Zurich

Hanna Kokko works on evolutionary ecology of sexual and asexual reproduction, analysis and management of animal populations, evolution of reproductive and social strategies, and sustainability science. **She will be teaching evolutionary biology.**

Recent publications: *Optimal germination timing in unpredictable environments: the importance of dormancy for both among- and within-season variation. Ten Brink H et al. Ecol Lett. 2020; Transmissible cancers and the evolution of sex under the Red Queen hypothesis. Aubier TG et al. PLoS Biology 2020; The rate of facultative sex governs the number of expected mating types in isogamous species. Constable GWA et al. Nat Ecol Evol. 2018.*

Eva Nogales, HHMI/University of California at Berkeley

Eva Nogales studies macromolecular assemblies of whole units of molecular function by direct visualization of their architecture, functional states, and regulatory interactions using state-of-the-art cryo-electron microscopy (cryo-EM) and image analysis, as well as biochemical and biophysical assays. **She will be teaching molecular, structural, and cell biology.**

Recent publications: *JARID2 and AEBP2 regulate PRC2 in the*

presence of H2AK119ub1 and other histone modifications. Kasinath V, et al. Science 2021; Structure of human TFIID and mechanism of TBP loading onto promoter DNA. Patel AB et al. Science. 2018; Near-atomic model of microtubule-tau interactions. Kellogg EH et al. Science. 2018.

Ingrid Lohmann, University of Heidelberg

Ingrid Lohmann is a developmental biologist, and her team works on the fundamental role of Hox proteins in the process of development of the fruit fly. More specifically, their interest goes from the control of stem cell proliferation to neurogenesis and metabolism during the process of development. **She will be teaching developmental biology.**

Recent publications: *ATF4-Induced Warburg Metabolism Drives Over-Proliferation in Drosophila. Sorge S et al. Cell Rep. 2020; Multi-level and lineage-specific interactomes of the Hox transcription factor Ubx contribute to its functional specificity. Carnesecchi J et al. Nature Commun. 2020; The Hox transcription factor Ubx stabilizes lineage commitment by suppressing cellular plasticity in Drosophila. Domsch K. et al. Elife 2019.*

Priyamvada Rajasethupathy, The Rockefeller University

Priya Rajasethupathy's team bridges systems genetics and systems neuroscience to provide unique cross-disciplinary insights into memory. She aims to reveal the molecular, structural, and functional changes governing the evolution of a memory, and ultimately further understand cognitive processes during health and disease. **She will be teaching neurobiology.**

Recent publications: *A Thalamic Orphan Receptor Drives Variability in Short-Term Memory. Hsiao K et al. Cell. 2020; Targeting Neural Circuits. Rajasethupathy P et al. Cell. 2016; Projections from neocortex mediate top-down control of memory retrieval. Rajasethupathy P et al. Nature. 2015.*

Daniel Mucida, The Rockefeller University

Daniel Mucida studies how the immune system associated with intestinal mucosae maintains a careful balance by generating efficient protective responses without jeopardizing its tolerance to innocuous foreign substances. **He will be teaching about host-pathogen interactions** and **disease ecology and epidemiology** together with his research team members **Angelina M. Bilate** and **Bernardo Reis**.

Recent publications: *Microbiota-modulated CART+ enteric neurons autonomously regulate blood glucose. Muller PA et al. Science. 2020; Adrenergic Signaling in Muscularis Macrophages Limits Infection-Induced Neuronal Loss. Matheis F et al. Cell. 2020; Mutual expression of the transcription factors Runx3 and ThPOK regulates intestinal CD4+ T cell immunity. Reis BS et*

al. Nature immunology 2013; T Cell Receptor Is Required for Differentiation, but Not Maintenance, of Intestinal CD4+ Intraepithelial Lymphocyte. Bilate AM, et al. Immunity 53 (5), 1001-1014. e20

William Bialek, Princeton University

William Bialek works on the dynamics of individual biological molecules, the decisions made by single cells in a developing embryo, and the system that the brain uses in representing information. **He will be teaching biophysics.**

Recent publications: *Coarse Graining, Fixed Points, and Scaling in a Large Population of Neurons. Meshulam L et al. Phys Rev Lett. 2019; Collective Behavior of Place and Non-place Neurons in the Hippocampal Network. Meshulam L et al. Neuron. 2017; Thermodynamics and signatures of criticality in a network of neurons. Tkačik G et al. Proc Natl Acad Sci U S A. 2015.*

Silvia De Monte, ENS Paris/Max Planck Institute for Evolutionary Biology

By combining mathematical models, experiments in controlled conditions and environmental data analysis, Silvia De Monte and her team explore the interplay of cellular-level properties and collective function on the ecological and evolutionary time scales. **She will be teaching microbial ecology.**

Recent publications: *Ubiquitous abundance distribution of non-dominant plankton across the global ocean. Ser-Giacomi E et al. Nat Ecol Evol. 2018; The evolution of adhesiveness as a social adaptation. Garcia T et al. Elife. 2015; Can we detect oceanic biodiversity hotspots from space?. De Monte S et al. ISME J. 2013.*

Carla Staver, Yale Uninversity

Her work focuses on the dynamics and distribution of biomes, especially within and at the intersection of savanna and forest. Her team uses a combination of empirical and modeling approaches to understand how local interactions of trees with their resource and disturbance environment scale up to predict landscape- and continental-scale patterns in tree cover and the distributions of biomes. **She will be teaching ecology** and **introduction to ecological theory.**

Recent publications: *Spatial patterning among savanna trees in high-resolution, spatially extensive data. Staver AC et al. Proc Natl Acad Sci U S A. 2019; Forest extent and deforestation in tropical Africa since 1900. Aleman JC et al. Nat Ecol Evol. 2018; Top-down determinants of niche structure and adaptation among African Acacias. Staver AC et al. Ecol Lett. 2012.*

Corina Tarnita, Princeton University

Corina Tarnita's research examines the organization and emergent properties of complex adaptive systems at multiple scales, from single cells to entire ecosystems. Simultaneously, her team uses empirical data to identify and catalog patterns in nature and, within the general frameworks, they develop models whose predictions they attempt to empirically test using eco-evolutionary experiments, molecular and genomic analyses, and field manipulations. **She will be teaching game theory in ecology and evolution.**

Recent publications: *Eco-evolutionary significance of 'loners'. Rossine F, et al. PLoS Biology. 2020; Emergence of diverse life cycles and life histories at the origin of multicellularity. Staps, M. et. al. Nature Ecology & Evolution. 2019; A theoretical foundation for multi-scale regular vegetation patterns. Tarnita CE et al. Nature. 2017.*

Jordi Bascompte, University of Zurich

Jordi Bascompte combines mathematical models, simulations, and data set analyses to address fundamental and applied questions in ecology. His current major research interest focuses on the structure and dynamics of ecological networks. Jordi is also a member of the Advisory Committee for the Training Program in Quantitative Biology and Ecology. **He will be teaching about community ecology and biodiversity,** and **ecological networks.**

Recent publications: *Indigenous knowledge networks in the face of global change. Cámara-Leret R et al. Proc Natl Acad Sci U S A. 2019; Ecological networks. On the structural stability of mutualistic systems. Rohr RP et al. Science. 2014; The sudden collapse of pollinator communities. Lever JJ et al. Ecol Lett. 2014.*

Iain Couzin, Max Planck Institute of Animal Behavior

Iain Couzin focuses on revealing the principles that underlie collective animal behavior. By developing an integrated experimental and theoretical program, his research aims to understand how, and why, social behavior has evolved in a large variety of systems, from swarming locust, to schooling fish, to flocking birds. **He will be teaching behavioral ecology.**

Recent publications: *Individual and collective encoding of risk in animal groups. Sosna MMG et al. Proc Natl Acad Sci U S A. 2019; Heterogeneous Preference and Local Nonlinearity in Consensus Decision Making. Hartnett AT et al. Phys Rev Lett. 2016; Revealing the hidden networks of interaction in mobile animal groups allows prediction of complex behavioral contagion. Rosenthal SB et al. Proc Natl Acad Sci U S A. 2015.*

Max Rietkerk, Utrecht University

Max Rietkerk's team has discovered that spatial vegetation patterns in dry ecosystems follow certain mathematical laws, which can provide insight into how close the ecosystem is to a threshold value for sudden desertification. The team studies the mechanisms leading to these patterns, through which they understand how sudden desertification can be prevented and how areas already affected can be restored. **He will be teaching spatial ecology.**

Recent publications: *The effect of climate change on the resilience of ecosystems with adaptive spatial pattern formation. Bastiaansen R et al. Ecol Lett. 2020; Multistability of model and real dryland ecosystems through spatial self-organization. Bastiaansen R et al. Proc Natl Acad Sci U S A. 2018; Self-organized patchiness and catastrophic shifts in ecosystems. Rietkerk M et al. Science. 2004.*

Malin Pinsky, Rutgers University

Malin Pinsky studies population and community dynamics in primarily coastal marine ecosystems with the goal of understanding the impacts of global change and the actions that could foster abundant wildlife and healthy ecosystems. His team uses statistical tools, field ecology, population genomics, and mathematical modeling to understand general patterns that extend across larger spatial scales, deeper in time, and across a wider range of species than would be possible with more traditional techniques. **He will be teaching climate change impacts of biodiversity,** and **conservation, management and decision-making.**

Recent publications: *Climate-driven shifts in marine species ranges: scaling from organisms to communities. Pinsky ML et al., Annual Review of Marine Science. 2020; Greater vulnerability to warming of marine versus terrestrial ectotherms. Pinsky ML et al. Nature. 2019; Preparing ocean governance for species on the move. Pinsky ML et al. Science. 2018.*