activities of the KLI

Annual Report '18

KLI

An Institute for the Advanced Study
of Natural Complex Systems

Contents

Review 2018 and Structure of the KLI

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Gli scienziati, come è sempre più raro che accada al giorno d'oggi, sono liberi di dedicarsi alle loro riflessioni approfittando di questo stato di sospensione del tempo.

The scientists are free – as it is increasingly rare these days – to dedicate themselves to deep reflections taking advantage of this state of respite.

Luca Tommasi
(Università Gabriele d'Annunzio, Chieti)

1.1 The Year in Review

2018 was yet another year full of activities, exciting events, and new developments at the KLI. The most important among these was the appointment of a new Scientific Director, Guido Caniglia, in November last year. Dr. Caniglia has a background in biology, philosophy, and history of science and has extensive expertise in the management and organization of scientific activities. He has already started a reform of all procedures and event formats and will expand the academic scope of the KLI to address several more applied domains, such as sustainability science and knowledge transfer to policy makers and society at large. We extend a very cordial welcome to Guido!

The scientific activities of 2018 included two successful Altenberg Workshops in Theoretical Biology, one on 'Hierarchy and Levels of Organization in the Biological Sciences' and the second on 'The Ground-Floor of Cognition: From Microbes to Animals and Plants.' In addition, a KLI Focus Group explored `Mechanisms and Evolution of Play,' and a Summer School on the topic of `Interdisciplinarity in the Life Sciences and their Philosophy,´ coorganized together with six European partner institutions, attracted more than 50 participants. A symposium on 'Theoretical Biology Today' celebrated Gerd Müller's retirement from the University of Vienna. Moreover, the KLI organized 29 Colloquia and two Professional Development events.

We are proud to report that the scientific projects of 2018 involved 25 KLI fellowships and three visiting scientists who came with their own funding. The KLI research community was also very productive in terms of publications: three new volumes appeared in the Vienna Series in Theoretical Biology, and four issues of the journal Biological Theory were published. The KLI fellows, visitors, and staff published 32 articles and gave 41 presentations at international conferences and meetings. The details of the fellow projects, events, and publications can be found in this report.

Unfortunately, there are also sorrowful events to mention. In 2018, we deplored the untimely passing of Manfred Wuketits. Dr. Wuketits was the first Scientific Director of the KLI and subsequently served as a member of the Board of Directors for more than two decades. He will be remembered as one of the KLI founding figures and a highly esteemed colleague and friend.

Looking ahead, the KLI will continue its mission of supporting young researchers and creating a center of interdisciplinary exchange and conceptual advancement at the forefront of scientific research. We gratefully acknowledge the continuous support by Traudl Engelhorn, who shares the visions of the KLI, and the valuable assistance by the members of the KLI Trust, the Board of Directors, the Scientific Advisory Board, the External Faculty, as well as the staff and fellows of the KLI.

Gerd B. Müller
President

1.2 The KLI

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The KLI is an international center for Theoretical Biology. The institute commits itself to the formulation, analysis, and integration of biological theories as well as the investigation of their scientific and cultural consequences. The thematic focus is on evolutionary biology, developmental biology, and cognition.
The KLI supports interdisciplinary research projects in these areas that aim at generating models of living systems or meta-theoretical constructions of historical, philosophical, or cultural aspects of biological theories. Research at the KLI is supported by fellowships in five different categories; granting decisions are based on international peer review.

The KLI also pursues its objectives by organizing international workshops, summer schools, and colloquia, and by publishing a scientific journal and a book series.

1.3 Organization of the KLI

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School of Audiology and Speech-Language Pathology,
University of Memphis, TN

Scientific Projects

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The KLI offers different types of fellowships for students, post-docs, and visiting scientists or scholars in the area of theoretical biology for a period of a few weeks up to two years. All project applications are subjected to an international review process.

2.1 Applications

In 2018, the KLI received a total of 53 applications for fellowships, 14 of these were granted for 2018 or 2019, achieving an overall acceptance rate of 26,4%.

2.2 Writing-Up Fellowships

Eva FERNÁNDEZ-LABANDERA
(July 2017 – January 2018)

Eva Fernandez-Labandera Tejado is a Ph.D. student from the University of the Basque Country (UPV/EHU) and works on her Ph.D. thesis 'Homeostasis, stability and regulation within a Systems Biology framework: conceptual analysis from a philosophical perspective' (supervised by Arantza Etxeberria and Alvaro Moreno).

Homeostasis and Regulation in a Systems Biology Conceptual Framework

This work is an attempt to redefine the notion of homeostasis, from a philosophical perspective, in order to make it useful for the ongoing investigations about organisms and systems in the fields of biology, physiology, immunology, philosophy, among others. In the first part I run a historical and philosophical analysis of the term 'From Claude Bernard to Systems Biology,' and in the second part I'll expose my own definition of homeostasis and some of the implications it might have in the actual debates about organism, on one hand, and on the definitions of health and disease, in the other. My hypothesis aims at demonstrating how compulsory it is such a redefinition, and try to offer an alternative one, which might be useful both from a theoretical and from a practical perspective.

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Chia-Hua LIN
(January – July 2018)

Chia-Hua Lin is a Ph.D. candidate in the Department of Philosophy at the University of South Carolina. She has received a KLI Write-Up fellowship to complete her dissertation titled ´Migrating Research Tools: The Journey of Formal Language Theory from Mathematics through Computer Science and Linguistics to Cognitive Biology.´ Her work is an historically informed philosophical analysis of the use of the formal language-based research tools in cognitive biology. These tools, including Chomsky hierarchy and automata theory, were developed in computer science and linguistics in 1950s-1960s. However, recent applications in comparative cognitive biology and neuroscience since the 2000s have given them new roles of guiding research that are novel to their established characteristics.
Using the case of formal language theory as an occasion, her work aims to achieve two goals. First, it develops concepts for philosophers with an interest in scientific practice to articulate and diagnose the epistemic risks associated with tool migration (i.e., making novel use of research tools in the realm of knowledge production). Second, and more importantly, it works towards a conceptual framework for managing the epistemic risks by better understanding the limitations of applying migrated research tools.

Borrow A Tool to Make Scientific Progress?
A Case Study in Cognitive Biology

This dissertation investigates scientific progress and epistemic risks in a case in which formal models are transferred from linguistics to biology. Initially constructed in linguistics to study natural language, Formal Language Theory (FLT) is a mathematical theory of computation that has been applied to research in comparative cognitive biology.

Consisting of formal models of languages, FLT provides a basis for ranking computational complexity, known as the Chomsky Hierarchy. Based on FLT, Tecumseh Fitch and fellow comparative biologists have designed artificial languages and tested the ability of human and nonhuman animals to learn languages of varying complexity. I argue that even though certain instrumental progress has been made by introducing FLT to biology, explanatory progress has been limited. Moreover, testing for the ability to learn an artificial language requires one to 'embody' the language in some manner or other, and choices about how to do so could lead to bias in the results of the test. However, due to discrepancies in the details concerning how the languages are embodied and exposed to human and nonhuman animal subjects, the results of learning need to be taken with a grain of salt.

Murillo PAGNOTTA
(August 2017 – February 2018)

Murillo Pagnotta holds a B.Sc. in Biology and a M.Sc. in Experimental Psychology. He is currently finishing his Ph.D. thesis (under the supervision of Kevin Laland) at the University of St. Andrews. He has worked as a science teacher and as editor and science writer in Brazil. Murillo was awarded a KLI Writing-Up Fellowship to complete his PhD thesis.

Towards a Relational-Processual Approach to Social Learning and 'Culture'

In many species learning, or skill development, may be influenced by the presence and the behaviour of other individuals, or the products of their behaviour. The term 'social learning' is currently used to refer to such processes which include teaching, imitation, emulation,

stimulus enhancement, and local enhancement. Processes of social learning underlie the 'passing on' of knowledge and behaviour among individuals within and across generations. This can lead to what is now commonly called behavioural 'traditions' or 'culture' in humans and nonhuman animals. In my thesis I focus on social learning and 'culture' in two complementary investigations. The conceptual-theoretical investigation follows from a dissatisfaction with how the currently dominant approaches to social learning are supported by, and in turn reinforce, info-centric views of development, inheritance, evolution, cognition, and 'culture.' I will therefore clarify the use of the term 'information' in these contexts. I will also review and begin to integrate three relational and process-oriented alternative frameworks which may provide an innovative and consistent way of thinking about social learning and 'culture'. They include 'developmental systems theory' in biology, 'radical embodiment approach' in the cognitive sciences, and 'relational thinking' in anthropology. The experimental investigation applies this relational-processual framework to examine the coordination of visual attention in child-instructor dyads during a joint making task.

Christine SYROWATKA
(September 2018 – February 2019)

Christine Syrowatka completed her Master of Science in biological Anthropology at the University of Vienna. Her master thesis was about the evolution of music in humans. After finishing her undergraduate studies, she working on developing a Geometric Morphometric Image Analysis (GMIA) at the Department of Theoretical Biology at the University of Vienna. She is currently completing her Ph.D. thesis at the University of Oslo under the supervision of Thomas Hansen. For the final phase of her dissertation, she has been awarded a KLI Writing-Up fellowship.

Evolvability and Robustness

Evolvability is the ability of a system or population to respond to selection by producing heritable and selectable phenotypic variation. In contrast robustness is the ability of a phenotype to persist against perturbations. By definition a system cannot be evolvable and robust at the same time. However, evolvability and robustness are both important properties to evolve complex traits. This creates a paradox for the evolution of complex phenotypes. Evolvability depends on the way how genetic variation translates into phenotypic variation. This process is the key to understanding the relationship between evolvability and robustness in complex organisms and how they shape evolutionary change. I am using two different types of mathematical models of the genotype-phenotype map to explore the relationship between evolvability and robustness. I am able to show that the relationship between evolvability and robustness depends on the topology of the genotype-phenotype map using a Boolean genotype-phenotype map. I am investigating more complex genotype-phenotype maps in a population-genetics context using reaction-diffusion models of pattern formation that are motivated by the development of butterfly eyespots. The reaction-diffusion model is used as genetic architecture in individual-based simulations of populations to study the influence of selection strength on evolvability and robustness. I am exploring the ability of the system to produce and maintain genetic variation over long-term evolutionary change and identify processes of pattern formation that facilitate evolvability and can give insight in the origination of novel patterns over time.

Luis Alejandro VILLANUEVA HERNÁNDEZ
(January – July 2018)

Luis Alejandro Villanueva Hernández completed his B.A. in Philosophy at the Benemérita University of Puebla BUAP, followed by a M.A. in Ethnomusicology at the National Autonomous University of Mexico UNAM.

Currently, he is a Ph.D. candidate in Philosophy of Science in the Institute for Philosophical Research at the National Autonomous University of Mexico, UNAM. From January to June 2016 he did a Ph.D. stay research under the supervision of Professor Ian Cross in the Centre for Music and Science at the Faculty of Music of the University of Cambridge. In his Ph.D. dissertation, supervised by Professor Sergio F. Martínez, he explores models of niche construction, material culture evolution, social interaction, cognitive ethnomusicology, cognitive archaeology and embodied music cognition, to develop a framework that would allow the integration of different scientific findings going on different disciplines that may be relevant to explain the origins of musical cognitive capacities. He has recently received a KLI Writing-Up fellowship to complete his Ph.D. thesis. He is also an active musician and plays a wide range of traditional musical instruments from Mexico and South America. He has been, for many years, a member of a Mexican musical band called Tsasná (moonlight in Totonac language) with which he has recorded several albums and performed in many international music festivals in Mexico, Europe, South America and Asia.

The Origins of Musical Behavior as Co-evolution of Cognitive Capacities of Social Interaction

According to niche construction perspective, the aim of this project is to develop a theoretical model to explain the origins of cognitive musical capacities not committed to the task of identifying one crucial cause (natural selection, sexual selection, genetic inheritance, brain architecture, pleasure production, or any other) that occurred in a specific period of time to solve a particular survival issue. Instead, it will be argued that cognitive musical capacities may have evolved as part of interdependent and intertwined bio-cultural processes that enhanced the evolution of our cognitive capacities for basic social interaction over the development of our hominin lineage.

Özlem YILMAZ
(April – October 2018)

Özlem Yilmaz holds a Bachelor's degree in Biology and a Master's degree from the Center of Environmental Sciences as well as a Master's in Biology Education. In 2006, Özlem started her Ph.D. and studied at three different universities (in Izmir, Sydney and Istanbul), all in different but closely related areas in Plant Science. After completing her Ph.D., she worked as a post-doctoral researcher in the Plant Physiology Lab in the Faculty of Engineering and Natural Sciences. In 2012, Özlem began a Ph.D. in Philosophy in Izmir and was recently awared a KLI Writing-Up fellowship to complete her Ph.D. in the Philosophy of Biology.

Plant Stress Physiology

The aim of this research is to investigate whether the ontology of 'stress' is more about encounter or resistance; it rises and discusses several questions. Stress is the responses of an organism to 'big' perturbations that cause drastic changes in phenomes which may be called as 'injured'. Does plant resist to the stressor or does it encounter with it? How do we call the degree of injury? The phenome of plant after encounter may be living better in the environment with the stressor so why do we see it as injured? How do we decide if it is susceptible or resistant to the stressor? Is this decision more about comparison between individuals or species; or their interaction with different degrees of the stressor? A living system encounters with the stressor actively. Does that mean it is an agent? How much do the concepts of 'resistance' and 'stressor' relate to the pragmatic causes about the fact that we need better adapted and bigger crop plants? How much do they relate to the ontology of encounter?

Roland ZIMM
(October 2017 – April 2018)

Roland Zimm studies evo-devo questions using mathematical models. In particular, he is interested in relating development with patterns of phenotypic variation. He completed his Biology studies at the Technical University of Dresden with a theoretical model of cell type transdifferentiation to join Isaac Salazar-Ciudad's group at Helsinki University. Currently, he is finishing his Ph.D. at the KLI.

On the Origins of Stability, Complexity and Novelties: Insights from a General Model of Development

A theory of the emergence of novelty, complexity and robustness in evolution could benefit from an understanding of the dynamics of development. I use a general multiscale computational model of development that includes all the cell behaviors and soft-matter bio-mechanical properties known in animal cells and tissues. This model also implements gene regulatory networks (GRNs), of any topology, that can affect mechanical properties and interactions of cells and tissues. By means of this model I explore the range of embryonic morphologies that can arise in animal development. In the emerging morphospace I study the diversity, complexity and stability of morphologies. Preliminary results indicate that GRNs with extensive cell-cell signaling tend to increase morphological robustness, but not complexity. This can be related to the changing role of GRNs in the early stages of the evolution of complex multicellular organisms, in line with theories by Müller and Newman. Furthermore, I address the problem of the much-discussed hourglass model of developmental variation by connecting it to developmental mechanisms.

2.3 Postdoctoral Fellowships

Riana Juhn BETZLER
(September 2016 – August 2018)

Riana Betzler holds a Bachelor's degree in Psychology from Yale University, New Haven, CT. She studied at the European College of Liberal Arts in Berlin and did her Master's Degree in Philosophy on 'The Multiple Meanings of Mechanisms: A Challenge for the New Mechanist Philosophy' at University of Cambridge. Her Ph.D. thesis 'What is Empathy and Is it Valuable?' was done under the supervision of Tim Lewens at University of Cambridge, UK.

Genealogical Approaches and the Origins of Empathy

In my postdoctoral research at the KLI, I aim to undertake two tasks. First, I seek to investigate the method of genealogy broadly considered. Second, I aim to apply a sophisticated evolutionary genealogical approach to the case of empathy. In the first part of my project, I seek to understand how various genealogical approaches – in particular philosophical genealogies as exemplified by Williams (2002) and Craig (1990), traditional evolutionary genealogies, and cultural evolutionary genealogies, as exemplified by the Heyes (2014), Sterelny (2003), and Richerson & Boyd (2005) – relate to one another. How similar are their methodologies? What are the differences between them? What might these various forms of genealogy, which look different on the surface, be able to contribute to one another? Can they be combined fruitfully? In the second part of my project, I aim to provide a sophisticated genealogical approach to empathy that brings together insights from the history of empathy as a human value (philosophical genealogy), cultural evolution, and more traditional biological evolutionary approaches. There is good reason to look to empathy as fertile ground for such an approach because it has

important connections with other traits and capacities that have been the subject of cultural evolutionary explorations, including mindreading, psychopathy, and cooperation. I hope that this sophisticated genealogical approach to empathy may help to provide the basis for a mature evolutionary approach to the emotions more broadly.

Sidney CARLS-DIAMANTE
(May 2018 – April 2020)

Sidney Carls-Diamante has recently received a Ph.D. in Philosophy from the University of Auckland. Her doctoral thesis explored how the octopus nervous system challenges a number of received views on the nature of cognition and consciousness. She has been awarded a KLI Postdoctoral Fellowship to work on a project entitled 'The Free Energy Principle: From Promises to Premises.' The aforesaid project explores explores how the theoretical framework of the free energy principle theory of cognitive brain function can be refined.

The Free Energy Principle: From Promises to Premises

This project explores the free energy principle (FEP), a highly controversial neuroscientific theory that claims that all forms of brain function can be reduced to a single type of process. The proponents of the FEP claim that if their theory is correct, it has the potential to 1) unify explanation in neuroscience, and 2) identify a fundamental ontological feature that neural operations, especially those that subserve cognition, evolved to exhibit. These unificatory and evolutionary claims are highly attractive, as they address two major issues surrounding the nature of theory in cognitive neuroscience. However, the extreme reductionism of the FEP has raised concerns about its explanatory validity, in particular that it comes across as an unfalsifiable 'theory of everything.' In order to secure its place as a plausible theory of brain

function and ultimately cognition, the FEP must first pass empirical and theoretical muster. This calls for two things: first, that its claims be verified by empirical testing, and second, that its claims be whittled down into more manageable premises detailing how it can bear out its unificatory and evolutionary promises.

Barbara FISCHER
(October 2015 – September 2019)

Barbara Fischer studied at University College Cork and University of Vienna where she graduated in Biomathematics. She made her Ph.D. in Evolutionary Biology and Biomathematics at the University of Berne, Switzerland. She worked at the University of Helsinki, the University of Berne and at IIASA, Laxenburg/Austria. She has been a Postdoctoral Research Associate at the University of Oslo and a Researcher and Lecturer at the University of Vienna.

Evolvability and Integration of the Human Pelvis

Compared to other primates, childbirth is remarkably difficult in humans because the head of a human neonate is large relative to the birth-relevant dimensions of the maternal pelvis. It seems puzzling that females have not evolved wider pelvises despite the high maternal mortality and morbidity risk connected to childbirth in humans. In the proposed project, I will build a comprehensive novel model of the evolution of the human pelvis. With this project, I will contribute to answering the question why this 'obstetric dilemma' still exists in modern humans. Current models explaining the evolution of human pelvic dimensions, or the lack thereof, are based on verbal arguments only. In contrast, I propose to use empirical data on phenotypic variation of pelvic dimensions in human populations (data from populations in North America, Europe, and Southern Africa) as well as mathematical models of evolutionary

dynamics (quantitative genetic models) that build on these data to quantitatively assess hypotheses on pelvis evolution. In particular, I will estimate the phenotypic integration and evolvability of different pelvic shape features. In an earlier study, I have shown that evolution has produced covariances between pelvis shape and other body dimensions that contribute to ease childbirth. Based on these results, I will compare the variational properties of the pelvis across sexes and populations. I will devise a quantitative model of the constraints imposed upon the evolution of the human pelvis using the collected empirical data and data from the gynecological literature.

Richard GAWNE
(September 2017 – February 2019)

Richard Gawne is a developmental and evolutionary biologist, currently working as a postdoctoral fellow at the KLI. He holds a Ph.D. in Biology from Duke University. Richard completed his dissertation on the development and evolution of wing patterning in the bella moth Utetheisa ornatrix *in 2017, under the supervision of Fred Nijhout. Before coming to the KLI, he was a visiting researcher at the Smithsonian National Museum of Natural History, and a Fulbright fellow at the University of Copenhagen's Center for Social Evolution.*

Agriculture as a Co-Evolutionary Process

It can be easy to forget that agriculture isn't a uniquely human accomplishment. Various species of ants, bees, beetles, and termites maintain fungus gardens that are used as a primary food source. This means that in order to develop a truly general hypothesis about the origins or consequences of agriculture, we need to take human and insect systems into account. A review of the published literature from both of these fields reveals that research on the evolution of agri-

cultural arrangements has been conducted almost exclusively from the perspective of the farmers, who are simply assumed to be 'in charge' of things. Accordingly, many have asked how the process of domestication affects the organisms being tended, but few have attempted to determine how partnering with a plant, animal, or fungus affects the evolutionary trajectory of the farmers. The driving rationale of my project is that agriculture should be studied as a co-evolutionary process that elicits significant changes in both farmers and cultivars. It is well known that the brain sizes of human-domesticated animals tend to be reduced, compared to their wild ancestors. Over the course of this project, I will use micro-CT scans to measure the ways in which entering into an agricultural relationship with fungi has impacted the brains of insect farmers. Normalizing for factors such as colony and body size, the prediction is that fungus-farming attine ants will show overall or region-specific reductions in brain size, compared to closely related hunter-gatherer species.

Ivan Dario GONZALEZ CABRERA
(March 2018 – Februar 2020)

Ivan Gonzalez-Cabrera recently completed his Ph.D. in Philosophy at the Australian National University supervised by Professor Kim Sterelny. He has been Research Student in Professor Yoshiyuki Hirono's lab at the University of Tokyo and Research Fellow at the Max Planck Institute for Evolutionary Anthropology under Professor Michael Tomasello's supervision. He was Writing-Up Fellow at the KLI in 2016. His research focuses on the intersection between biology and psychology, and their philosophical implications. Most of his previous work has been concerned with issues about normative cognition, with a secondary interest in causal and physical cognition. As a KLI Postdoctoral Fellow, he is currently working on normative disagreement and its role in the emergence of large-scale cooperation and cultural complexity in humans.

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The Role of Normative Disagreement in the Emergence of Large-Scale Cooperation and Cultural Complexity in Humans

The proposed research focuses on the evolution and development of normative disagreement and its relation to the emergence of large-scale cooperation and cultural complexity. Normative disagreement is an understudied cause of cultural complexity via norm diversification. It leads to both opposing norms that govern the same aspects of our lives as well as norms that govern different aspects of it such as moral, religious, political, and epistemic norms. Human norm-psychology is often seen as a key driver of large-scale cooperation in our lineage. But large-scale cooperation is constantly threatened by normative disagreement, whether moral, religious, political, or epistemic. In this project, I aim to understand the evolutionary and developmental roots of these kinds of disagreement, the proximal mechanisms responsible for handling them, and the consequences that the underlying psychology of moral disagreement had for the expansion of cooperation in large, culturally complex societies.

Lumila MENENDÉZ
(September 2018 – August 2019)

Lumila Menéndez is a bioanthropologist, with a B.A. in Anthropology, and a Ph.D. in Natural science, both from the University of La Plata. During her Ph.D. she contributed to discuss the strong impact that nutritional components have on the cranial shape of South American populations. She was a post-doctoral fellow at University of Tübingen, where she was studying the skeletal pattern of the earliest Andean populations living at highlands. She currently holds a postdoctoral fellowship at the KLI. Her main research interest is

human evolution, specifically the peopling and concomitant morphological diversification of South America. She investigates this with a particular focus on the impact of non-random factors on the skeleton.

Influence of Diet on Human Face and Mandibular Variation

The face and mandible have been described as the two cranio-mandibular modules with the strongest environmental influence. Moreover, due to the prominent functional role that they have during chewing, it was suggested that diet mostly contribute to shape them. Most previous studies describe these modules independently, using either a local or a worldwide approach, and evaluating diet qualitatively. As a result, it is not clear the differential role that diet might have played on shaping the facial and mandibular variation during human evolution, while diet diversity is reduced and simplified, thus avoiding its multifactorial complexity. In contrast, in the present project I propose to analyse diet as a continuous quantitative variable, and also to evaluate the degree of association between diet diversity, facial, and mandibular variation, in order to address the differential influence that diet might have had on shaping craniofacial variation in humans. For this, I will use two morphometric databases, a worldwide sample, and a local one from the Argentinean Pampas that spans through the Holocene (9,000-500 years BP). In addition, I will estimate bite force, collect δ13C, δ15N, archaeological and ethnographic data, which will be used to quantitatively characterize diet, thus incorporating quantitative independent variables into the statistical model. It is expected to build a more suitable method for studying the influence of ecology on the skeleton. Therefore, this project would contribute to the on-going debate on the influence of ecological factors on humans' skeleton, whose interpretations could be extended to the fossil record.

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Daniel J. NICHOLSON
(September – December 2018)

Daniel Nicholson holds Masters degrees in Molecular and Cellular Biology (University of Bath) and in History and Philosophy of Science (University of Leeds). In 2010 he obtained his Ph.D. in Philosophy (University of Exeter). His doctoral thesis presented a critical examination of mechanistic thinking in biology. At present, he is particularly interested in the role of machine models in biological explanations, in the task of providing a naturalistic account of organismic purposiveness, and in philosophical arguments for the autonomy of biology. He also has a longstanding interest in the history of theoretical biology. Dan was a postdoctoral fellowship at the KLI, a research fellow at the Cohn Institute for History and Philosophy of Science and Ideas of Tel Aviv University and a research fellow at the Centre for the Study of Life Sciences (Egenis) of the University of Exeter.

The Organism Reconsidered

This project aims to provide a new theoretical understanding of the nature of the organism. Taking the machine conception of the organism as its critical target, the project will elaborate an ontological conception of life that highlights its intrinsically purposive self-maintaining organization. It will also consider the implications that such non-mechanical – yet scientifically-grounded – understanding has for how living systems should be studied and explained, and more generally for how the epistemic relation between biology and the physical sciences should be construed. This novel philosophical outlook on organisms will be developed by drawing on a virtually forgotten school of biological thought known as 'organicism,' which came to prominence between the First and Second World Wars, but which subsequently became marginalized following the rise of molecular biology. By revisiting the organicist tradition and updating its core ideas, the project will not only reshape current theoretical views regarding the nature of life, but also restore organisms to their

rightful place in the edifice of biological theory. In the process of doing so, the organism-centred perspective developed in the project will be used to address a number of highly topical issues in the philosophy of biology. Overall, the project will demonstrate that, despite all efforts to consign it to the dustbin of history, organicism has never been more relevant than it is today. The main output of the project will be an extended monograph, already under contract with MIT Press, which will eventually appear as part of the Vienna Series in Theoretical Biology.

Stephanie SCHNORR
(February – October 2018)

Stephanie is a biological anthropologist interested in understanding the dietary landscape accessed by human ancestors that enabled the evolution of large brains and complex cognition. During her Ph.D., she worked with the Hadza of Tanzania to investigate food acquisition and processing behaviors in how these alter the digestibility of plant food resources, mainly underground storage organs, or tubers. Through her research on digestion, Stephanie became interested in understanding the role of the gut microbiota in human nutritional acquisition, particularly in consideration of human foragers who often rely on refractory plant resources that are high in fiber. Her research ranges from work on reconstructing ancient microbiomes from human tissue to ethnographic modeling of food processing in understanding the dietary flexibility of present day humans. Stephanie Schnorr was a Postdoctoral Associate at the Oklahoma University and a KLI Postdoctoral Fellow. In September 2018, she was awared a Fellowship of the US National Science Foundation (NSF) and now works as an NSF fellow at the KLI on her project 'Relevance of Positive Selection on Human Salivary Amylase Gene.'

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Archean Links to the Human Brain: Lipid Metabolism of Gut Microbiota Across the Terrestrial Biome

Lipids play an essential role in cellular structure, signaling, and energy storage. As nonpolar molecules composed of carbon and hydrogen, lipids form nonsoluable structural units that designate the inter- and extra-cellular spaces where biological activities take place. Critically, omega-3 long-chain polyunsaturated fatty acids (LC-PUFAs), form the main structural constituents of the brain, nervous system, and photoreceptors. While the emergence of higher-order aerobic organisms became possible only after oxygenation of the atmosphere, a mere 600 million years ago, primordial bacteria and archaea had a 2.5 billion year head-start to evolve lipid metabolism genes in an anaerobic marine environment especially enriched in the omega-3 LC-PUFAs. As complex life emerged on land, lipid availability switched to a dominance of omega-6 fatty acids, yet neural and retinal tissue still relied on omega-3 LC-PUFA. Since terrestrial sources of omega-3 LC-PUFAs are rare, the anaerobic polyketide PUFA-synthase complex presents an interesting yet unexplored process by which animals could derive essential fatty acids through their microbiome. The network of lipid coding genes, however, remains vastly under studied. Therefore, this proposal details an investigation on the network arrangements of prokaryote lipid metabolism from animal gut microbiota. The goal is to characterize different microbiomes by their ability to manufacture nutritionally important lipids, with particular attention to the essential omega-3 fatty acids. This research forms the proof of concept for a larger project initiative to resolve the paradox of human brain development in the presence of only terrestrial dietary resources.

2.4 Senior Fellowships

Harold DE VLADAR
(March 2017 – February 2019)

Harold de Vladar is a cell biologist, statistical physicist and artist with a main focus on evolutionary biology. He purposely escapes any disciplinary categorisation and researches on a wide range of subjects spanning genetics, evolution, structural biology, ecology, cancer, synthetic biology, art&science, neuroscience, language, culture and others. Harold has a creative pulse for inter-disciplinary methods and is successful in identifying analogies across subjects that give new ways to understand and study evolving systems, such as a statistical-mechanical view of population genetics, an evolutionary description of language and culture, sonification of protein structures, etc. Harold intellectually roots himself with haunting foundational questions of science. He is a researcher in the Hungarian Academy of Sciences and in Parmenides Foundation, near Munich.

Cognitive Cultural Evolution

I propose studying parallels and connection between cultural change and organic evolution using computational and mathematical models. My proposal considers cognitive accounts of concept formation by applying notions of neuroscience and of evolutionary biology to language games. These can be coupled to population dynamics, including spatial mobility and also generational change to study genetic-cultural coevolution.

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Daniel J. NICHOLSON
(December 2018 – September 2019)

Daniel Nicholson holds Masters degrees in Molecular and Cellular Biology (University of Bath) and in History and Philosophy of Science (University of Leeds). In 2010 he obtained his Ph.D. in Philosophy (University of Exeter). His doctoral thesis presented a critical examination of mechanistic thinking in biology. At present, he is particularly interested in the role of machine models in biological explanations, in the task of providing a naturalistic account of organismic purposiveness, and in philosophical arguments for the autonomy of biology. He also has a longstanding interest in the history of theoretical biology. Dan was a postdoctoral fellowship at the KLI, a research fellow at the Cohn Institute for History and Philosophy of Science and Ideas of Tel Aviv University and a research fellow at the Centre for the Study of Life Sciences (Egenis) of the University of Exeter.

The Organism Reconsidered

This project aims to provide a new theoretical understanding of the nature of the organism. Taking the machine conception of the organism as its critical target, the project will elaborate an ontological conception of life that highlights its intrinsically purposive self-maintaining organization. It will also consider the implications that such non-mechanical – yet scientifically-grounded – understanding has for how living systems should be studied and explained, and more generally for how the epistemic relation between biology and the physical sciences should be construed. This novel philosophical outlook on organisms will be developed by drawing on a virtually forgotten school of biological thought known as 'organicism,' which came to prominence between the First and Second World Wars, but which subsequently became marginalized following the rise of molecular biology. By revisiting the organicist tradition and updating its core ideas, the project will not only reshape current theoretical views regarding the nature of life, but also restore organisms to their rightful place in the edifice of biological theory. In the process

of doing so, the organism-centred perspective developed in the project will be used to address a number of highly topical issues in the philosophy of biology. Overall, the project will demonstrate that, despite all efforts to consign it to the dustbin of history, organicism has never been more relevant than it is today. The main output of the project will be an extended monograph, already under contract with MIT Press, which will eventually appear as part of the Vienna Series in Theoretical Biology.

Stefanie WIDDER
(March 2017 – February 2018)

Stefanie Widder is a computational biologist, a senior fellow at the KLI and affiliated with the Medical University of Vienna. She is working on the systems biology of complex communities, in particular microbial consortia and gene regulatory networks. Her research aims at predictive understanding of complex community functions that find application in human health and related fields.

The Role of the Environment in Shaping Microbial Communities

Microbes are everywhere and make up most of the biomass on earth. They occur in assemblages or microbial communities (MCs) and conduct complex, collective functions that are of highest importance for biogeochemical cycles on earth and human well being alike. E.g., the microbiome in the human gut can be actively health promoting or causative for chronic diseases or cancer. These emergent community functions are driven by microbial interactions. Despite their relevance, microbial interactions have only recently become subject of scientific research. In the proposed research I will study how divers environments and the predictability of perturbation in these habitats shape microbial interactions and collective functions.

Based on my prior studies I hypothesize that distinct perturbation levels in natural habitats give rise to different organization of interactions – these types can be detected in sequence data and used for establishing mechanistic understanding of community function. I will use an integrative systems biology approach to study the environmental impact: I will setup a mathematical model that allows the simulation of MCs in predictable and unpredictable environments. I will associate environmental perturbation levels with signatures in community structure and temporal dynamics in the simulated data. Based on the model outcome I will develop a generic concept of environmental predictability that is applicable to seemingly far-apart cases like the human microbiome or microbiota in soil or wastewater treatment plants. This concept will be used for the analysis of natural MCs from distinct habitats with the aim of predicting community behaviour. The proposed research will have direct applications in medicine, industrial biotech and global climate regulation.

2.5 Przibram Fellowship

James DiFRISCO
(October 2017 – September 2018)

James DiFrisco received his Ph.D. in Philosophy from University of Leuven with a dissertation entitled 'Process and Levels of Organization: A Dynamic Ontology for the Life Sciences.' His research focuses on problems related to biological organization, functions, individuality, and levels, as well as on a variety of themes in naturalistic metaphysics including physicalism and the relations between scientific domains.

Hierarchy and Individuality

According to ordinary intuition, living individuals and organisms are the same thing. Developments in the life sciences, however, have indicated that familiar organisms are just one case of individuality among others, including genes, cells, colonies, groups, species, and even ecosystems. It has therefore become a problem to explain what it is, in general, that makes something a biological individual. My project takes its point of departure from the insufficiency of evolutionary explanations currently on offer, in which being an individual roughly means being a unit of selection. Instead of opposing this by recourse to more physiological explanations of individuality, however, I suggest it will be more illuminating to integrate both within a more general hierarchical framework. I propose to do this by introducing into the discussion a dynamical or process-based view of both individuation and hierarchical organization. A dynamical perspective ensures that biological individuation is explained as an ongoing, evolving process. A hierarchical perspective is necessary for accommodating the fact there are different dynamics at different levels and scales that are causally responsible for individuating biological systems.

Carrying out this project will involve developing an alternative to the dominant approaches to biological hierarchy theory that relies on dynamical parameters and pervasive scalar properties of the living world. I also connect the issues of biological individuality and hierarchy to wider concerns about the explanatory power of natural selection, problems with biological functionalism, and the relationships between biology and the other natural sciences.

2.6 Visiting Scientists

Ehab ABOUHEIF
(November 2017 – May 2018)

Ehab Abouheif studied biology at Concordia University, Montreal (B.Sc., 1993), at SUNY, Stony Brook, NY, and at Duke University, Durham, NC. He was a Postdoc in the Department of Organismal Biology and Anatomy at the University of Chicago (2002-03) and in the Department of Integrative Biology, Howard Hughes Medical Institute, University of California, Berkeley (2003-04); Nipam Patel was his supervisor both in Chicago and Berkeley. From 2004 to 2010 he was Assistant Professor at McGill University, Montreal, Quebec, and subsequently Associate Professor in the Department of Biology at McGill University, where he held the Canada Research Chair in Evolutionary Developmental Biology. He stayed at the KLI in 2011 with a visiting fellowship. He is now a Professor at McGill University and has recently been awared a Guggenheim Fellowship and a KLI Visiting Fellowship for his stay at the KLI

The Theory of Mesoevolution

As a Visiting Fellow at the KLI, my main goal will begin, and make substantial progress, writing a monograph that expands and formalizes my 'Theory of Mesoevolution' (Abouheif 2008. Parallelism as the pattern and process of mesoevolution. Evolution & Development 10 (1): 3-5). This theory, which promises to potentially connect the domains of micro- and macroevolution, will tackle one of the largest and unresolved questions in evolutionary biology. It will attempt to make this connection through the concept of parallelism, which is often defined as the independent evolution of traits that share a common developmental basis. Parallel evolution

is widespread and represents a 'gray zone' between homologous and convergent evolving traits. I will argue in my monograph that this gray zone is the key for linking micro- and macroevolution.

Marta BERTOLASO
(August – September 2018)

Marta Bertolaso is Associate Professor for Philosophy of Science, Faculty of Engineering, University Campus Bio-Medico of Rome. Since 2008, after having experienced in first hand some bio-medical research, she has been developing her philosophical training, skills and academic CV. Her main interests have been for the biological complexity, inter-level regulatory processes' models and the philosophy of cancer. She developed her research program in in contact with the national and international scientific and academic environments, both Anglo-Saxon and Spanish speaking communities. She also investigated contemporary issues related to the notion of progress in biotechnology and in silico medicine. She has been a speaker of philosophy of science and bioethics in several Italian universities, in Munich, Puebla and Mexico DC, and in St. Louis. She is the Editor in Chief of the Springer series 'Human Perspectives in Bio-Medical Sciences & Technology.'

Interactions between Metaphysics and Biology: The Case of Teleology. A Comparison between Development and Cancer

In recent work, Daniel McShea has proposed to understand biological teleology in the framework of the theory of compositional hierarchies, so that containing structures or systems are the source of direction (teleology) of contained substructures or subsystems. He offers examples of developmental processes, in particular of primary mesenchyme cell migration in skeleton formation of sea urchin embryos. Recent

work in biology and philosophy of cancer also seems to point in the same direction, since the fate of the cells seems to depend on the context in which they are. But on the other hand, developmental and neoplastic processes are different as cancer can be described precisely as the pathology of development. In this project we intend to address this apparent tension and explore the consequences that such comparison between development and cancer has for contemporary philosophical debates on biological teleology. We hope that this will allow us to defend also, as a secondary aim, the plausibility of a fertile interaction between analytic metaphysics and biology, in particular, an interaction that can be described as 'philosophy FROM biology,' that is, the consequences that biological discoveries have for philosophy.
This is a joint project of Marta Bertolaso and Maria Cerezo.

Maria CEREZO
(August – September 2018)

María Cerezo is Professor of Logic and Philosophy of Science at the Department of Philosophy of the University of Murcia. Her initial interests centred on the Philosophy of Language, in particular, the Tractatus Logico-philosophicus of Ludwig Wittgenstein. From 2008 on, she has started working on issues of Philosophy of Biology, and in particular on metaphysical issues that arise in biological concepts and problems. She is the coordinator of the research project Metaphysics of biology: framing the interactions between molecular, developmental and evolutionary biology. Her interests in Philosophy of Biology center in issues such as: metaphysical theories of persistence applied to species evolution; causation, individuation and teleology in developmental biology; and dispositional theories of genes.

Interactions between Metaphysics and Biology: The Case of Teleology. A Comparison between Development and Cancer

In recent work, Daniel McShea has proposed to understand biological teleology in the framework of the theory of compositional hierarchies, so that containing structures or systems are the source of direction (teleology) of contained substructures or subsystems. He offers examples of developmental processes, in particular of primary mesenchyme cell migration in skeleton formation of sea urchin embryos. Recent work in biology and philosophy of cancer also seems to point in the same direction, since the fate of the cells seems to depend on the context in which they are. But on the other hand, developmental and neoplastic processes are different as cancer can be described precisely as the pathology of development. In this project we intend to address this apparent tension and explore the consequences that such comparison between development and cancer has for contemporary philosophical debates on biological teleology. We hope that this will allow us to defend also, as a secondary aim, the plausibility of a fertile interaction between analytic metaphysics and biology, in particular, an interaction that can be described as 'philosophy FROM biology,' that is, the consequences that biological discoveries have for philosophy.
This is a joint project of Marta Bertolaso and Maria Cerezo.

Roberta May FISHER
(June – July 2018)

I was awarded my B.A. in Biological Sciences from Oxford University in 2010, where I then continued onto my Ph.D. between 2012-2015 under the supervision of Prof. Stu West. My Ph.D. thesis focused on understanding the factors favouring major evolutionary transitions, and particularly multicellularity, using a combination of experimental and comparative methods. After my Ph.D. I moved to Amsterdam to work with Prof. Toby Kiers at

Vrije Universiteit, where I worked on the evolution of symbiosis. In 2017, I was awarded a Distinguished Post-doctoral Fellowship from the Carlsberg Foundation, to work with Prof. Koos Boomsma at the University of Copenhagen. In my current position in Copenhagen, I am using baker's yeast as a model system to understand multicellular evolution and continuing using comparative methods to investigate major evolutionary transitions more broadly.

Huxley's Individuality Updated

The natural world can be viewed as the product of many 'major evolutionary transitions,' which have resulted in the formation of new types of individual – genomes, cells, organisms and superorganisms. This is a powerful and popular framework, most famously presented by Maynard-Smith & Szathmary (1995), but that was actually predated by an interesting and innovative text 'The Individual in the Animal Kingdom' by Julian Huxley in 1912. Myself and Rick Gawne plan to write a new introduction to this book, relating Huxley's pre-Modern Synthesis view to the newer more theoretical research on major evolutionary transitions, in order to highlight both the old and the new and provide insights for current research.

Rajendhran RAJAKUMAR
(June 2018)

Rajendhran Rajakumar received his B.Sc .in cell and molecular biology at Concordia University. During this time, he volunteered in the lab of Ehab Abouheif at McGill University where he fell in love with the elegance of ant societies, and decided to stay and pursue a PhD. As an NSERC (National Science and Engineering Research Council of Canada) Postdoctoral Fellow in the lab of Martin J. Cohn (University of Florida), he utilized cartilaginous fish to investigate the evolutionary and

developmental origins of vertebrate traits. Currently, as a CIHR (Canadian Institute of Health Research) Postdoctoral Fellow in the lab of Norbert Perrimon (Harvard Medical School), he utilizes Drosophila genetics to address elusive mechanistic questions that he has generated with non-model organisms. Primarily, he uses ants as a model to understand how ecology can act on developmental processes, generating morphological variation and subsequent evolution. Beyond this, by examining an array of invertebrate and vertebrate systems and using a combination of approaches integrating fieldwork and phylogenetics with developmental genetic, epigenetic and integrative physiology, he has attempted to tackle questions as diverse as: why recurrent phenotypes appear in nature, how epigenetic mechanisms generate quantitative trait variation, and how do organs intercommunicate to maintain homeostasis.

Darwin's Invisible Ink: The Role of Ancestral Developmental Potential in Evolution

To Darwin, realizing that the perturbation of organismal development can lead to the expression of ancestral characters, hidden like invisible ink, overwhelmingly demonstrated to him the existence of heredity. More generally, the ubiquitous occurrence of ancestral reversions, known as atavisms, solidified the principle of common descent, and the evolutionary tree of life. Yet Darwin went beyond the acknowledgment of their existence and wondered how organisms can retain a latent capacity, the 'power of calling back to life long-lost characters,' to produce ancestral traits, which can be reactivated by changed conditions. This remarkable dual capacity of retaining and re-expressing lost ancestral traits has been almost completely underappreciated by the mainstream evolutionary community. Here, I propose that the underlying developmental mechanism of Darwin's concept of Invisible Ink, although relegated to obscurity, is critical to the evolutionary process. Inspired by findings from my own work, ranging from ants to cartilaginous fish, and that of others, we (Ehab Abouheif & myself) will attempt to construct a syn-

thesis, which resurrects this concept's importance. Rather than hopeful or hopeless monsters, or solely evidence for common descent, this developmental capacity is important and represents ancestral developmental potentials (ADP). ADP can be retained (for potentially millions of years), in a hidden form, by molecular processes such that when induced, it can serve as raw materials for natural selection. Furthermore, this ancient variation is not historically blind to selection; rather it is potentially preadaptive, and can be induced by recurrent environmental and genetic conditions, facilitating parallel evolution and novelty.

Hans-Jörg RHEINBERGER
(September – October 2018)

The main focus of Hans-Jörg Rheinberger's research lies in the history and epistemology of experimentation in the life sciences. By bridging the gap between the study of history and contemporary cutting-edge sciences, such as molecular biology, his work represents an example of transdisciplinarity as emerging in the present knowledge-based society. The Swiss-born scientist studied Philosophy and Biology in Tübingen and Berlin, Germany. He received his M.A. in Philosophy in 1973, his Ph.D. in Biology in 1982, and his habilitation in Molecular Biology in 1987. He was Assistant Professor at the University of Lübeck, Germany and Associate Professor at the University of Salzburg. Since 1997, he has been a Scientific Member of the Max Planck Society and Director at the Max Planck Institute for the History of Science in Berlin.
Hans Jörg Rheinberger has been a fellow of the Institute for Advanced Study in Berlin and of the Collegium Helveticum in Zürich. He is Honorary Professor at the Institute for Philosophy and History of Science of the Technical University Berlin, a member of the Berlin-

Brandenburg Academy of the Sciences, a member of the Leopoldina, the German Academy of Natural Scientists, and a doctor honoris causa at the Swiss Federal Institute of Technology in Zurich. He is a member of the Scientific Advisory Board of the KLI.

Richard Goldschmidt's Experimental Work and the Notion of Phenocopy

I would like to use my short stay at the Konrad Lorenz Institute for a study of the experimental genetical work of Richard Goldschmidt with Lymantria. Goldschmidt was appointed Director at the newly founded Kaiser Wilhlem Institute for Biology in Berlin-Dahlem in 1914. Together with Carl Correns and Max Hartmann, he made the Institute a leading center for experimental genetics. In earlier work, I have already looked in detail into the experimental work of botanist Carl Correns. Another of my earlier studies followed Max Hartmann's experiments on the asexual propagation of protists, as well as the experimental system exploring gene action in Ephestia of Alfred Kühn, the successor of Goldschmidt as Director at the KWIB (all published in An Epistemology of the Concrete–Twentieth Century Histories of Life, Duke University Press 2010). Goldschmidts experimental work has so far found less attention than his theoretical publications and evolutionary conjectures. I would like to pursue my studies on the history of genetics at the KWIB with a study on Goldschmidt. Of particular interest in this context is the formation of the concept of 'phenocopy' and the role that the phenomena covered by it played in the historical building up of an experimental access to gene physiology. I have already collected the literature for carrying out that work, and I would like to take advantage of a stay at the KLI for screening that literature in a concentrated effort.

Gentaro TAGA
(January – March 2018)

Gentaro Taga is a professor at Graduate School of Education, the University of Tokyo. He received a Ph.D. degree in Pharmaceutical Sciences (Biophysics) from the University of Tokyo in 1994 under the supervision of Prof. Hiroshi Shimizu. Gentaro Taga was a JSPS Postdoctoral Fellow of at Yukawa Institute for Theoretical Physics, Kyoto University and Neuro-Muscular Research Center, Boston University in 1994. He joined the complex system research group of Prof. Kunihiko Kaneko as an Assistant Professor at Department of Pure and Applied Sciences, University of Tokyo in 1995. He was jointly appointed as a HFSP short term fellow to study infant perception at psychophysics laboratory of Prof. Shinsuke Shimojo at California Institute of Technology in 1998. In 2000, he established Developmental Brain Science Laboratory at Graduate School of Education, University of Tokyo. He was a visiting scholar, Biomedical Optics Research Laboratory, Clinic of Neonatology, University Hospital Zurich. He was awarded Andrzei J. Komor Young Investigator Award, International Symposium on Computer Simulation in Biomechanics, Paris and 1st Japan Society for the Promotion of Sciences Prize.

Developmental Dynamics of Human Brain and Behavior

Recent progress on human brain imaging has revealed the developmental processes for the morphogenesis of the macro-anatomical structure and the complex network generation in embryo and fetus. Physiological and behavioral studies on human infants have also shown that the metabolism, blood flow and neural activity undergo drastic changes after birth and the sensorimotor and cognitive behaviors emerge from the interaction with the changing environment. While such empirical data in human development have been accumulated, few studies have tried to construct a theo-retical framework that links the human brain development with emergence of behaviors over the long time scale from

embryo to infant. In the present study, an integral theory of the human brain development in terms of energy production, morphogenesis and information creation is constructed. To do this, I will study different types of dynamical system's theories for pattern formation, neural activity, metabolic changes, network, and information.

2.7 Scientist with Own Funding

Chia-Hua LIN
(August – November 2018)

Chia-Hua Lin is a Ph.D. candidate in the Department of Philosophy at the University of South Carolina. She has received a KLI Write-Up fellowship to complete her dissertation titled 'Migrating Research Tools: The Journey of Formal Language Theory from Mathematics through Computer Science and Linguistics to Cognitive Biology.' Her work is an historically informed philosophical analysis of the use of the formal language-based research tools in cognitive biology.
These tools, including Chomsky hierarchy and automata theory, were developed in computer science and linguistics in 1950s-1960s. However, recent applications in comparative cognitive biology and neuroscience since the 2000s have given them new roles of guiding research that are novel to their established characteristics.
Using the case of formal language theory as an occasion, her work aims to achieve two goals. First, it develops concepts for philosophers with an interest in scientific practice to articulate and diagnose the epistemic risks associated with tool migration (i.e., making novel use of research tools in the realm of knowledge production). Second, and more importantly, it works towards a conceptual framework for managing the epistemic risks by better understanding the limitations of applying migrated research tools.

Borrow A Tool to Make Scientific Progress? A Case Study in Cognitive Biology

This dissertation investigates scientific progress and epistemic risks in a case in which formal models are transferred from linguistics to biology. Initially constructed in linguistics to study natural language, Formal Language Theory (FLT) is a mathematical theory of computation that has been applied to research in comparative cognitive biology. Consisting of formal models of languages, FLT provides a basis for ranking computational complexity, known as the Chomsky Hierarchy. Based on FLT, Tecumseh Fitch and fellow comparative biologists have designed artificial languages and tested the ability of human and nonhuman animals to learn languages of varying complexity. I argue that even though certain instrumental progress has been made by introducing FLT to biology, explanatory progress has been limited. Moreover, testing for the ability to learn an artificial language requires one to 'embody' the language in some manner or other, and choices about how to do so could lead to bias in the results of the test. However, due to discrepancies in the details concerning how the languages are embodied and exposed to human and nonhuman animal subjects, the results of learning need to be taken with a grain of salt.

Luis Alejandro HERNANDEZ VILLANUEVA
(August 2018 – January 2020)

Luis Alejandro Villanueva Hernández completed his B.A. in Philosophy at the Benemérita University of Puebla BUAP, followed by a M.A. in Ethnomusicology at the National Autonomous University of Mexico UNAM. Currently, he is a Ph.D. candidate in Philosophy of Science in the Institute for Philosophical Research at the National Autonomous University of Mexico, UNAM. From January to June 2016 he did a Ph.D. stay research under the supervision of Professor Ian Cross in the Centre

for Music and Science at the Faculty of Music of the University of Cambridge. In his Ph.D. dissertation, supervised by Professor Sergio F. Martínez, he explores models of niche construction, material culture evolution, social interaction, cognitive ethnomusicology, cognitive archaeology and embodied music cognition, to develop a framework that would allow the integration of different scientific findings going on different disciplines that may be relevant to explain the origins of musical cognitive capacities. He has recently received a KLI Writing-Up fellowship to complete his Ph.D. thesis.
He is also an active musician and plays a wide range of traditional musical instruments from Mexico and South America. He has been, for many years, a member of a Mexican musical band called Tsasná (moonlight in Totonac language) with which he has recorded several albums and performed in many international music festivals in Mexico, Europe, South America, and Asia.

The Origins of Musical Behavior as Co-evolution of Cognitive Capacities of Social Interaction

According to niche construction perspective, the aim of this project is to develop a theoretical model to explain the origins of cognitive musical capacities not committed to the task of identifying one crucial cause (natural selection, sexual selection, genetic inheritance, brain architecture, pleasure production, or any other) that occurred in a specific period of time to solve a particular survival issue. Instead, it will be argued that cognitive musical capacities may have evolved as part of interdependent and intertwined bio-cultural processes that enhanced the evolution of our cognitive capacities for basic social interaction over the development of our hominin lineage.

Stephanie SCHNORR
(September 2018 – August 2020)

Stephanie is a biological anthropologist interested in understanding the dietary landscape accessed by human ancestors that enabled the evolution of large brains and complex cognition. During her Ph.D., she worked with the Hadza of Tanzania to investigate food acquisition and processing behaviors in how these alter the digestibility of plant food resources, mainly underground storage organs, or tubers. Through her research on digestion, Stephanie became interested in understanding the role of the gut microbiota in human nutritional acquisition, particularly in consideration of human foragers who often rely on refractory plant resources that are high in fiber. Her research ranges from work on reconstructing ancient microbiomes from human tissue to ethnographic modeling of food processing in understanding the dietary flexibility of present day humans. Stephanie Schnorr was a Postdoctoral Associate at the Oklahoma University and a KLI Postdoctoral Fellow. In September 2018, she was awared a Fellowship of the US National Science Foundation (NSF) and now works as an NSF fellow at the KLI on her project 'Relevance of Positive Selection on Human Salivary Amylase Gene.'

Physiological Relevance of Salivary Amylase

Human salivary alpha amylase (sAA) is the most abundant protein found in saliva. The expression of sAA is regulated by copy number variation (CNV) of the AMY1 gene, and the enzyme is responsible for the breakdown of starch into simple sugars. We lack specific knowledge as to how changes in sAA concentration impacts starch digestion during mastication or through downstream regulatory effects. Importantly, no

empirical research exists that explores rate variation in the hydrolysis of raw versus cooked starch. Using a controlled in-vitro and histological approach along with human subject validation trials, I intend to address questions about the starch degrading activity of sAA in the mouth, and the potential nutritional advantages brought about by a selective increase in AMY1 CNV in human evolutionary history. These questions address diet related selective events that occurred along human evolutionary history. Understanding the resulting nutritional benefits and potential susceptibilities to metabolic and inflammatory disease promises not only resolution of our distinctly human traits but also advances towards evolution-arily-informed models of targeted therapies. This project uses a multidisciplinary approach to tackle relevant questions in the field of anthropology and human evolutionary research.

Meetings and Lectures

3

The KLI supports international workshops, symposia, and individual talks that are organized by the KLI or in cooperation with other institutions.

3.1 Altenberg Workshops in Theoretical Biology

The 'Altenberg Workshops' address key questions of biological theories. Each workshop is organized by leading experts of a certain field who invite a group of international specialists to the KLI. The Altenberg Workshops aim to make conceptual progress and to generate initiatives of a distinctly interdisciplinary nature. Further information concerning the participants and their presentations can be found on the KLI website. Workshops hosted at the new institute building in Klosterneuburg are continued as 'Altenberg Workshops.'

36th Altenberg Workshop in Theoretical Biology 8 – 11 March 2018

Hierarchy and Levels of Organization in the Biological Sciences
KLI Klosterneuburg

Organization: Daniel S. Brooks, James DiFrisco, and William C. Wimsatt

Topic and Aims

Notions of hierarchical structure or levels of organization play a number of important theoretical roles in the biological sciences, and can be found operating in the background of several recent debates in philosophy of science. Nevertheless, apart from some local exceptions, these notions have not received the careful scrutiny they deserve. We propose to make them the subject of an Altenberg Workshop. Our proposed workshop will provide a venue for leading contributors on the topic to engage in a collective re-examination of the concept of levels of organization as it arises in specific problem-contexts. These include questions about how to rigorously formulate a conception of levels, hierarchical evolutionary theory, structural and ecological hierarchy theories, issues surrounding levels and causation, multilevel explanation, and finally, critical challenges to the usefulness of hierarchy and levels.

Program

JAN BAEDKE
Ruhr University of Bochum
Where Do New Levels Come From?

46 ROBERT BATTERMAN
University of Pittsburgh
Multiscale Modeling in Inactive and Active Materials

DANIEL S. BROOKS
The Levels Doctrine: A Piece of Biology's Edifice

JAMES DiFRISCO
Konrad Lorenz Institute for Evolution and Cognition Research & KU Leuven
Levels of Developmental Evolution

MARKUS ERONEN
University of Groningen
The Nature of Hierarchical Organization in Biology

CARL GILLETT
Northern Illinois University
Understanding Levels in the Sciences: Returning to Compositional Explanations and their Backing Relations

SARA GREEN
University of Copenhagen
Defining the 'Right' Level or Scale: Lessons from Cancer Biology

JAMES GRIESEMER
University of California, Davis
Scales, Levels, Hierarchies: Toward a Process Ontology for Organization in Biology

ALAN C. LOVE
University of Minnesota
Manipulating Levels of Organization

ANGELA POTOCHNIK
University of Cincinnati
Prizing Apart Levels Concepts

THOMAS REYDON
Leibniz University Hannover
Functional Kinds and the Metaphysics of Functional Levels

ILYA TËMKIN
Smithsonian Institute
&
NILES ELDREDGE
American Museum of Natural History
Hierarchy Theory of Evolution and the Human Story

JON UMEREZ
University of the Basque Country
Autonomous Hierarchies – Pattee's Approach to Function and Control as Time-dependent Constraint

WILLIAM C. WIMSATT
University of Chicago & University of Minnesota
Levels, Perspectives, Causal Thickets Revisited: Cultural Evolution

JAMES WOODWARD
University of Pittsburgh
Levels, Modeling, and Autonomy

37th Altenberg Workshop in Theoretical Biology 14 – 17 June 2018

The Ground-Floor of Cognition: From Microbes to Plants and Animals
KLI Klosterneuburg

Organization: Fred Keijzer and Pamela Lyon

Topic and Aims

The Darwinian assumption that very simple organisms may yield principles critical to understanding the biology of Homo sapiens has led to monumental discoveries, yet the cognitive sciences have tended to resist this approach.

Now an absence of theory has become a handicap, particularly in neuroscience. The workshop will examine organisms neglected by the cognitive sciences – unicellular organisms, plants and simple animals with and without nervous systems – to see if the mechanisms by which they sense and respond to the world can illuminate similar functions in more complex animals, including humans. We propose the 'ground-floor' of biocognition lies in cellular signaling, and predict that the patterns of activity in signal transduction networks found in social microbes and simple unicellular and multicellular eukaryotes can provide important clues to how cognition has evolved and how animal brains work.

Program

DETLEV ARENDT
European Molecular Biology Laboratory-Heidelberg
Origin and Evolution of Central Nervous Systems

ARGYRIS ARNELLOS
University of the Basque Country
Individuality and Cognition: An Organizational Story of Co-Evolution

FRANTISEK BALUSKA
University of Bonn
Plant Cognition and Behavior

WILLIAM BECHTEL
University of California, San Diego
Decision Making: Heterarchical Control of Endogenously Active Biological Mechanisms

PAWEL BURKHARDT
University of Norway
Origin and Evolution of Synaptic Proteins

AUDREY DUSSUTOUR
CNRS, Toulouse
Learning in Slime Molds

PETER GODFREY-SMITH
University of Sydney
Minimal Cognition, Proto-Subjectivity, and Other Perplexities

EVA JABLONKA
Tel-Aviv University
From Cognition to Consciousness: The Learning Route

GÁSPÁR JEKELY
University of Exeter
Peptidergic Signaling at the Origin of Nervous Systems

FRED KEIJZER
University of Groningen
On the Origin of Subjects

SIMON LAUGHLIN
University of Cambridge
Have Constraints on Protein Circuits Shaped the Evolution of Cognition?

MICHAEL LEVIN
Tufts University
What Do Bodies Think About? Bioelectric Basis of Somatic Primitive Cognition in Embryogenesis, Regeneration, and Cancer

PAMELA LYON
Flinders University of South Australia
Basal Cognition: Filling in a Darwinian Jigsaw

DANIELA PINTO
Technical University of Dresden
Signal Transduction in Bacteria: The Special Case of Alternative Sigma Factors

PAULINE SCHAAP
University of Dundee
Cell Signaling in Dictyostelid Social Amoebas and Its Evolution From a Unicellular Stress Response

3.2 KLI Focus Group

The KLI Focus Group is a newly developed format that gathers leading experts of an interdisciplinary field with the aim to develop ideas on a particular subject and generate suggestions for action. The invitees come from different scientific backgrounds and strive to develop specific, practical goals within the designated period of one to two weeks.

2nd Focus Group
2 – 13 July 2018

Understanding the Mechanisms and Evolution of Play
KLI Klosterneuburg

Organization: Jeffrey Schank

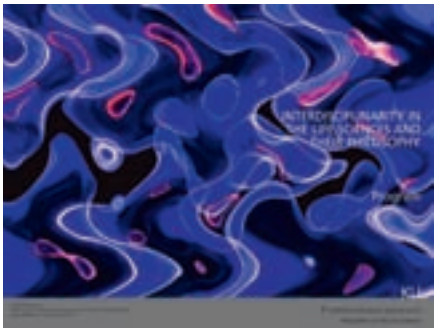
Topic and Aims

To develop a clearer and deeper theoretical and empirical understanding of the evolutionary mechanisms that produce play and how these mechanisms may be transformed over evolutionary time. This deeper understanding will be achieved by bringing together experts on the (1) neurobehavioral mechanisms of play, (2) comparative analysis of play in diverse taxa, (3) modern statistical methods in comparative biology, and (4) evolutionary computational models of play. Theoretical and conceptual work accomplished will be published in a book that will be the first systematic theoretical, empirical, and conceptual analysis of the evolution of play.

Focus Group Participants

GORDON BURGHARDT, University of Tennessee
SERGIO M. PELLIS, University of Lethbridge
ELISABETTA PALAGI, University of Pisa
JEFFREY SCHANK, University of California, Davis
PAUL SMALDINO, University of California, Merced
LOUK VANDERSCHUREN, University of Utrecht

3.3 Summer School



5th European Advanced Seminars in the Philosophy of the Life Sciences (EASPLS) 10 – 14 September 2018

Interdisciplinarity in the Life Sciences and Their Philosophy
KLI Klosterneuburg

School Directors: Sabina Leonelli and Thomas Reydon
Local Organizer: Isabella Sarto-Jackson

Topic and Aims

EASPLS 2018 focuses on contributions on all aspects of interdisciplinarity in the life sciences, interdisciplinarity between the life sciences and other areas of research (such as engineering and the physical and social sciences), as well as interdisciplinarity in the philosophy of the life sciences (for instance, integrating philosophy with historical or social scientific methods). The aim of the summer school is to bring together graduate students and senior scholars whose work reflects on the nature of interdisciplinary work in the life sciences, on the prerequisites for getting interdisciplinary research projects off the ground, on the role that the philosophy of the life sciences can play in facilitating interdisciplinary scientific research and the 'bridging' of disciplines, or on the position that work in the philosophy of the life sciences can occupy as a part of interdisciplinary research projects in the life sciences. The organizers aim to assemble a community of scholars addressing these issues from a wide variety of perspectives and whose research focuses on a diversity of topics. The following areas of work serve to illustrate the sorts of issues that are in focus for the summer school, but it should be emphasized that EASPLS 2018 aims to cover the topic of interdisciplinarity conceived broadly and not limited to the issues mentioned below.

Unity and diversity in the life sciences:

The life sciences constitute a very diverse set of fields of work, including fields such as evolutionary biology, phylogenetic systematics, population genetics, ecology, conservation biology, developmental biology, behavioral biology, crop science, synthetic biology, microbiology, biomedical research, epidemiology, and

many more. What binds these fields of work together is their concern with phenomena in the living world. At the same time, they show an enormous diversity with respect to their theoretical underpinnings, their metaphysical commitments, their research aims and questions, and their methodologies, raising the question how (dis-)unified the life sciences in fact are. How large exactly are the theoretical and methodological differences between the various areas of life science? This is not merely a question of theoretical interest, but also one that touches scientific practice, as many research projects in the life sciences rely on contributions from multiple fields of work. What does it take to get interdisciplinary research projects in the life sciences to work? What sorts of obstacles do researchers from different areas of life science encounter when working in interdisciplinary contexts, and how can such obstacles be overcome?

Darwinism bridging disciplines:

Authors such as Daniel Dennett (Darwin's Dangerous Idea, 1995), or Gary Cziko (Without Miracles: Universal Selection Theory and the Second Darwinian Revolution, 1995) have long argued that evolutionary thinking constitutes a powerful scientific tool that can be applied both to biological phenomena and to phenomena outside the biological realm. At present there are several strong movements that attempt to establish evolutionary research programs outside the life sciences, such as economics and organizational science or the philosophy of science. Richard Dawkins, one of the most vocal proponents of Darwinian thinking, however, cautioned against an 'uncritical dragging of some garbled version of natural selection into every available field of human discourse, whether it is appropriate or not. Maybe the 'fittest' firms survive in the marketplace of commerce, or the fittest theories survive in the scientific marketplace, but we should at the very least be cautious before we get carried away' ('Why Darwin matters,' The Guardian, Friday 8 February 2008). This cautioning raises the question what it takes to apply a theoretical framework such as Darwinian evolutionary theory to phenomena outside its original domain of application. What are the conceptual, epistemological and metaphysical requirements that need to be met to construct genuinely evolutionary explanations of phenomena in economics and other non-biological domains? How can evolutionary biology be integrated with areas of work outside biology to create new research programs?

History and philosophy of the life sciences as an interdisciplinary area of study:

Many philosophers working on the life sciences use interdisciplinary methods, drawing on historical or social science methods such as the collection and analysis of archival sources, interviewing, surveys, ethnography and participative

observation. What methods best fit the philosophical study of the life sciences and its key subject matter, life itself? What are the philosophical and practical implications of adopting one method over another, and what are the challenges and opportunities involved in building bridges between philosophy and other branches of scholarship focusing on the study of science (including history, sociology, science and technology studies, anthropology, geography, innovation studies and so forth)?

Philosophy of biology as theoretical biology:

What happens when philosophers become participants in biological research? How does philosophy fit in the workflow and conceptual apparatus deployed by biologists, particularly (but not only) in situations where several branches of biology are involved? And how is the position of biological and medical research within philosophy itself to be conceptualized (a question typically confronted by philosophers who collaborate in scientific projects, and wish their scientific colleagues to appreciate and understand philosophical contributions)? We are hoping for papers that examine the roles that philosophy of biology can play as a contributor to biological research, and the implications that such roles may have on the content of both scientific knowledge and philosophical scholarship; and/or the roles that biology plays within philosophy itself, as a subject matter, provider of empirical resources and evidence, source of conceptual inspiration and constraint on philosophical thinking.

Program

GERD B. MÜLLER
University of Vienna & KLI Klosterneuburg
Welcome Address

GRY OFTEDAL
University of Oslo
Converging Philosophy and Life Science in the Framework of Responsible Research and Innovation (RRI)

MAËL LEMOINE
University of Bordeaux
A Populational View on Disease

JONATHAN NAJENSON
The Hebrew University of Jerusalem
Commentary to Maël Lemoine

STEPHEN SANDERS
Michigan Technological University
Commentary to Maël Lemoine

MARTIN WASMER
Leibniz University Hannover
Interpreting European GMO Law –
A Case for 'Applied' Philosophy of Biology

CHIA-HUA LIN
KLI Klosterneuburg
Migrating Research Tools: The Journey of Formal Language Theory from Mathematics through Computer Science and Linguistics to Cognitive Biology

WILLIAM BAUSMAN
University of Geneva
Why Do Biologists Use the Methodologies That They Do?

Round Table Discussion
Conducting Interdisciplinary Research
CAROLINE ANGLERAUX (University of Paris-1 Sorbonne)
RIANA BETZLER (KLI Klosterneuburg)
SOPHIE VEIGL (University of Vienna)
Moderated by SABINA LEONELLI (University of Exeter)

JOHN DUPRÉ
University of Exeter
Pluralism, Process, and Interdisciplinarity

SOPHIA ROUSSEAU-MERMANS
University of Paris-1 Sorbonne
Commentary to John Dupré

HAILEY KWON
University of California, San Diego
Commentary to John Dupré

GUIDO CANIGLIA
Leuphana University & KLI Klosterneuburg
From Explaining Life to Saving It: Experiments and Evidence in Inter- and Trans-Disciplinary Sustainability Science

GREGOR GRESLEHNER
University of Salzburg
Commentary to Guido Caniglia

CRISTINA VILLEGAS CERREDO
Complutense University of Madrid
Commentary to Guido Caniglia

STEFANO CANALI
Leibniz University Hannover
Exposome Research in Epidemiology: Interdisciplinarity in Action

KEPA RUIZ-MIRAZO
University of the Basque Country, San Sebastián
Philosophical Problems About the Origins of Life

BENJAMIN SMART
University of Exeter
Commentary to Kepa Ruiz-Mirazo

CLAUDIO FLORES-MARTINEZ
University of Hamburg
Commentary to Kepa Ruiz-Mirazo

DOOK SHEPHERD
University of Adelaide
Interdisciplinary Syzygy – Lessons from the Honeybee

CATERINA SCHÜRCH
Ludwig-Maximilians-University Munich
Come Together! Interdisciplinary Research Practice, Mechanisms, and the Nature of Integration

56 STEVE ELLIOTT
Arizona State University
Research Projects in Interdisciplinary Science

MARCEL WEBER
University of Geneva
From Reduction to Inter-level Scientific Practice:
The Spemann-Mangold Organizer and Molecular Developmental Biology

NAÏD MUBALEGH
University of Lisbon & University of Paris-1 Sorbonne
Commentary to Marcel Weber

ELENA RONDEAU
University of Bordeaux
Commentary to Marcel Weber

RICHARD GAWNE & JAMES DIFRISCO
KLI Klosterneuburg
Science Communication in the Modern University

DIJANA MAGĐINSKI
University of Bielefeld
Commentary to Richard Gawne & James DiFrisco

AUGUST MARTIN
Leiden University
Commentary to Richard Gawne & James DiFrisco

JAVIER SUAREZ
University of Exeter & University of Barcelona
Dysbiosis and the Humoral Conception of Disease: Integrating Biology, History, and Philosophy into a New Research Domain

KARIM BARAGHITH
Heinrich Heine University Düsseldorf
The Causal Interactionist Population Concept in Generalized Darwinian Systems

AZITA CHELLAPPOO
University of Cambridge
Adaptation without Reproduction: Lessons from Cultural Evolution

Round Table Discussion
Collaborating with Biologists
GUGLIELMO MILITELLO (University of the Basque Country, San Sebastián)
LYNN CHIU (University of Bordeaux)
NINA KRANKE (Westfälische Wilhelms University Münster)
TOMÁŠ MIHULKA (Charles University, Prague)
Moderated by Thomas Reydon (Leibniz University Hannover)

GIOVANNI BONIOLO
University of Ferrara
Integration and Complexity in Biomedicine

MICHAL HLADKY
University of Geneva
Commentary to Giovanni Boniolo

August Martin
Leiden University
Commentary to Giovanni Boniolo

THOMAS PRADEU
University of Bordeaux
A Plea for Philosophy in Science

ISOBEL RONAI
University of Sydney
Commentary to Thomas Pradeu

SUKI FINN
University of Southampton
Commentary to Thomas Pradeu

ÖZLEM YILMAZ
KLI Klosterneuburg
Plant Stress Physiology: A Clear Manifestation of Process Philosophy

58 PHILIPPE HUNEMAN
University of Lisbon & University of Paris-1 Sorbonne
Revisiting the Modern Synthesis: The Case of Ecology

MARÍA FERREIRA RUIZ
University of Buenos Aires & University of Geneva
Commentary to Philippe Huneman

CALEB HAZELWOOD
Georgia State University
Commentary to Philippe Huneman

3.4 Cooperative Events

Runder Tisch ‘Die vielen Seiten des Menschen: Transdisziplinäre Zugänge zur Anthropologie‘

18 January 2018
KLI Klosterneuburg

Organized by: Philipp Mitteroecker, Katrin Schäfer, Bernhard Hadolt and Barbara Breunlich

Inhalt und Zielsetzung

Ziel der Veranstaltung ist es, das aktuelle Spannungsfeld und zukünftige Potential verschiedener, zuweilen konkurrierender Disziplinen – von der Genetik und biologischen Anthropologie bis hin zu den Kultur- und Sozialwissenschaften – in einer lockeren Atmosphäre zu diskutieren und dabei Experten und Akteure aus Wien zusammen zu führen. Dabei sollen ideologische, historische, sowie methodische und terminologische Hürden für ein transdisziplinäres Studium menschlicher Komplexität aufgezeigt werden.

Participants

MATTHIAS BECK, Institut für Systematische Theologie, Universität Wien; Österreichische Bioethikkommission

BARBARA BREUNLICH, Österreichisches Institut für Familienforschung

SABINE EGGERS, Anthropologische Abteilung, Naturhistorisches Museum Wien

MARTIN FIEDER, Department für Evolutionäre Anthropologie, Universität Wien

BARBARA FISCHER, Konrad Lorenz Institut für Evolutions- und Kognitionsforschung, Klosterneuburg

BERNHARD HADOLT, Institut für Kultur- und Sozialanthropologie, Universität Wien

MANFRED HAMMERL, Institut für Soziologie, Universität Graz

BARBARA MAIER, Abteilung für Gynäkologie & Geburtshilfe, Wilhelminenspital; Österreichische Bioethikkommission

PHILIPP MITTERÖCKER, Department für Theoretische Biologie, Universität Wien und Konrad Lorenz Institut für Evolutions- und Kognitionsforschung

GERD MÜLLER, Department für Theoretische Biologie, Universität Wien und Konrad Lorenz Institut für Evolutions- und Kognitionsforschung, Klosterneuburg

HERTA NÖBAUER, Institut für Kultur- und Sozialanthropologie, Universität Wien

DORIS PANY-KUCERA, Anthropologische Abteilung, Naturhistorisches Museum Wien und Institut für Orientalische und Europäische Archäologie, Österreichische Akademie der Wissenschaften

KATHARINA REBAY-SALISBURY, Instititut für Orientalische und Europäische Archäologie, Österreichische Akademie der Wissenschaften

ISABELLA SARTO-JACKSON, Konrad Lorenz Institut für Evolutions- und Kognitionsforschung, Klosterneuburg

KATRIN SCHÄFER, Department für Evolutionäre Anthropologie, Universität Wien

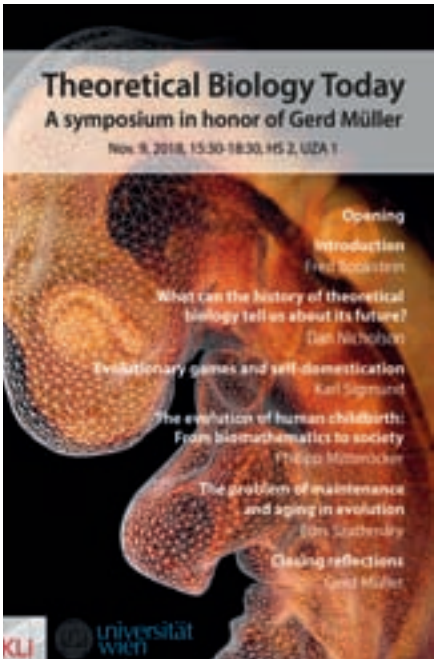
MARIA TESCHLER-NICOLA, Anthropologische Abteilung, Naturhistorisches Museum Wien

TATJANA THELEN, Institut für Kultur- und Sozialanthropologie, Universität Wien

GABRIELE WICHART, Institut für Kultur- und Sozialanthropologie, Universität Wien

HARALD WILFING, Department für Evolutionäre Anthropologie, Universität Wien

SONJA WINDHAGER, Department für Evolutionäre Anthropologie und Department für Theoretische Biologie, Universität Wien



Symposium in Honor of Gerd Müller 'Theoretical Biology Today' 9 November 2018

University of Vienna

Organized by: Philipp Mitteroecker

Program

FRED BOOKSTEIN
University of Vienna & University of Washington
Introduction

DANIEL J. NICHOLSON
KLI Klosterneuburg
What Can the History of Theoretical Biology Tell Us about Its Future?

KARL SIGMUND
University of Vienna
Evolutionary Games and Self-Domestication

PHILIPP MITTEROECKER
University of Vienna
The Evolution of Human Childbirth: From Biomathematics to Society

EÖRS SZATHMÁRY
Eötvös Loránd University, Budapest
The Problem of Maintenance and Aging in Evolution

3.5 KLI Colloquia

KLI Colloquia are informal, public talks taking place at the KLI Klosterneuburg. Abstracts of the presentations and information about the lecturers can be found on the website of the institute.

EHAB ABOUHEIF
University of Montreal & KLI Klosterneuburg
Obligate Endosymbiosis in Ants Reveals Developmental Steps to Major Evolutionary Transitions

BERNHARD HADOLT
University of Vienna
Pre-symptomatic Genetic Counselling in Austrian Clinical Practice

GUIDO CANIGLIA
Leuphana University, Lüneburg
Wasp Societies as Microcosms for the Study of Development and Evolution. Historical Narratives and Epistemological Reflections

ROLAND ZIMM
University of Helsinki
On the Origins of Complexity, Stability, and Variation: A General Model of Development

CHIA-HUA LIN
University of South Carolina & KLI Klosterneuburg
Tool Migration: A Framework for Analyzing Cross-disciplinary Use of Formal Systems

GENTARO TAGA
University of Tokyo & KLI Klosterneuburg
Human Brain and Behavioral Development: A Dynamical System's View of Human Development from Morphogenesis of the Brain in Embryo to Emergence of Behaviors in Infants

STEPHANIE SCHNORR
KLI Klosterneuburg
Exploring the Microbial Gene Landscape for Evidence of Lipid Nutritional Pathways to Support Brain Growth

62 IVAN GONZALEZ-CABRERA
KLI Klosterneuburg
Normative Cognition: A Research Roadmap

LUMILA MENÉNDEZ
University of Tübingen
Influence of Diet Texture on Human Facial and Mandibular Variation: South America as a Study Case

CLAUS LAMM
University of Vienna
The Neural Mechanisms of Empathy, and the Way in Which We May Share the Feelings of Others

SOPHIE VEIGL
University of Vienna
The Inheritance of Small RNAs – A Case for Theoretical Pluralism?

LUIS ALEJANDRO VILLANUEVA HERNÁNDEZ
KLI Klosterneuburg
Musical Capacities and Social Interaction: A Coevolutionary Approach

ALBRECHT VON MÜLLER
Parmenides Center, Pullach
A Brief Introduction to Cognostics

BARTLOMIEJ SWIATCZAK
University of Science and Technology of China
Organismic Constraints on Somatic Evolution of Lymphocytes

ÖZLEM YILMAZ
Istanbul Technical University & KLI Klosterneuburg
Plant Stress Physiology

ALICE LACINY
Natural History Museum, Vienna & University of Vienna
Studying the "Exploding Ants" of Southeast Asia

RAJENDHRAN RAJAKUMAR
Harvard Medical School & Harvard Medical School
Darwin's Invisible Ink: How Ancestral Developmental Potential Facilitates Convergence and the Evolution of Novelty

CLAUDIA PASSOS-FERREIRA
New York University
Are Infants Conscious?

RICHARD GAWNE
KLI Klosterneuburg
The Development and Evolution of Tiger Moth Wing Patterning

ROBERTA MAY FISHER
Københavns Universitet
The Major Evolutionary Transitions in Individuality

FRANÇOISE PELLET
University of Münster
The Extinction of Life: An Inquiry into Disease

MARTA BERTOLASO & MARÍA CEREZO
University of Rome & University of Murcia
Teleology in Biology: Questions and Issues from Development and Cancer

SIDNEY CARLS-DIAMANTE
KLI Klosterneuburg
Single Arm Use in Octopuses and Motor Control by Prediction Error

RIANA BETZLER
KLI Klosterneuburg
Finding Empathy: How Neuroscientific Measures, Evidence, and Conceptualizations Interact

CHRISTINE SYROWATKA
University of Oslo & KLI Klosterneuburg
Evolvability and Robustness – A Paradox in Evolutionary Theory

HANS-JÖRG RHEINBERGER
Max Planck Institute for the History of Science, Berlin & KLI Klosterneuburg
Philosophy Meets Art. On the Encounter between Gaston Bachelard and Albert Flocon

HARDOLD DE VLADAR
KLI Klosterneuburg
Dynamics and Stability of Multicultures. A Theoretical Perspective Based on Language Games

GÜNTER WAGNER
Yale University
Plasticity, Stress, and Evolutionary Novelties

LENNY MOSS
University of Exeter
'Human Nature,' Natural Detachment and the Hybrid Hominin

Publications

4

Scientific publications and presentations of fellows and staff members of the KLI in 2018.

4.1 Vienna Series in Theoretical Biology

The 'Vienna Series' is published by The MIT Press as a book series. Books are mainly based on the Altenberg Workshops and the resulting contributions and new syntheses. The book projects are subjected to a reviewing process by The MIT Press.

Volume 20:

GISSIS SB, LAMM E, and SHAVIT A, eds
Landscapes of Collectivity in the Life Sciences

Volume 21:

SCHWARTZ JH, ed
Rethinking Human Evolution

Volume 22:

O'BRIEN MJ, BUCHANAN B, and EREN MI, eds
Convergent Evolution in Stone-Tool Technology

4.2 Professional Papers and Books

AAYENI FA, BIAGI E, RAMPELLI S, FIORI J, SOVERINI M, AUDU HG, CHRISTINO S, CAPORALI L, SCHNORR SL, CARELLI V, BRIGIDI P, CANDELA M, TURRONI S.
Infant and Adult Gut Microbiome and Metabolome in Rural Bassa and Urban Settlers from Nigeria
Cell Reports 23: 3056–3067

BAEDKE J.
Organism, Where Art Thou? Old and New Challenges for Organism-Centered Biology
Journal of the History of Biology. Doi: 10.1007/s10739-018-9549-4

BAEDKE J, Mc MANUS SF.
From Seconds to Eons: Time Scales, Hierarchies, and Processes in Evo-Devo
Studies in History and Philosophy of Biological and Biomedical Sciences 72: 38–48

BETZLER RJ.
How to Clarify the Aims of Empathy in Medicine
Medicine, Healthcare, and Philosophy 21: 569–582

BROOKS DS, ERONEN MI.
The Significance of 'Levels of Organization' for Scientific Research: A Heuristic Approach
Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences 68: 34–41

DiFRISCO J.
Biological Processes: Criteria of Identity and Persistence
In: Everything Flows: Towards a Processual Philosophy of Biology (Nicholson DJ, Dupré J, eds), pp 76–95
Oxford: Oxford University Press

DiFRISCO J.
Token Physicalism and Functional Individuation
European Journal for Philosophy of Science 8: 309–329

ERONEN MI, BROOKS DS.
Levels of Organization in Biology
The Stanford Encyclopedia of Philosophy: https://plato.stanford.edu/archives/spr2018/entries/levels-org-biology/

FAUST K, BAUCHINGER F, DE BUYL S, LAHTI L, WASHBURNE A, LAROCHE B, GONZE D, WIDDER S.
Community Model Selection from Microbial Time Series Data
Microbiome 6: 120

FERRARIO CE.
Is High Fidelity Imitation Necessary for Cumulative Culture? An Analysis of the Ratchet Argument
PhD thesis, Victoria University of Wellington

FISCHER B.
Die Evolution des menschlichen Beckens und die Bedeutung für die Geburt
Speculum – Zeitschrift für Gynäkologie und Geburtshilfe 36: 10–13

GONZALEZ-CABRERA I.
Peer Competition and Cooperation
In: Encyclopedia of Evolutionary Psychological Science (Shackelford TK, Weekes-Shackelford V, eds)
Springer International Publishing: New York

HORDIJK W, NAYLOR J, KRASNOGOR N, FELLERMANN H.
Population Dynamics of Autocatalytic Sets in a Compartmentalized Spatial World
Life 8:33

HORDIJK W, STEEL M, DITTRICH P.
Autocatalytic Sets and Chemical Organizations: Modeling Self-sustaining Reaction Networks at the Origin of Life
New Journal of Physics 20: 015011

LANGE A, NEMESCHKAL HL, MÜLLER GB.
A Threshold Model for Polydactyly
Progress in Biophysics and Molecular Biology 137: 1-11

68 LIN C-H.
Tool Migration: A Framework to Study the Cross-disciplinary Use of Mathematical Constructs in Science
PhD Thesis, University of South Carolina

McGHEE GR, HUE I, DARDAILLON J, PONTAROTTI P.
A Proposed Terminology of Convergent Evolution
In: Origin and Evolution of Biodiversity (Pontarotti P, ed), pp 331–340
Springer: Cham

NUÑO DE LA ROSA GARCÍA L, MÜLLER GB.
Evolutionary Developmental Biology – A Reference Guide
(Nuño de la Rosa Garcia L, Müller GB, eds)
Online Encyclopedia, Springer: New York, NY

OETTLER J, PLATSCHEK T, SCHMIDT C, RAJAKUMAR R, FAVÉ MJ, KHILA A, HEINZE J, AND ABOUHEIF E.
Alternative Developmental Routes to Male and Female Wing Polyphenism in Cardiocondyla Ants
Journal of Experimental Zoology, Part B: Molecular Developmental Evolution, DOI: 10.1002/jez.b.22834

PAGNOTTA M.
Living and Learning Together: Integrating Developmental Systems Theory, Radical Embodied Cognitive Science, and Relational Thinking in the Study of Social Learning
PhD Thesis, University of St Andrews

PETERSON T, MÜLLER GB.
Developmental Finite Element Analysis of Cichlid Pharyngeal Jaws: Quantifying the Generation of a Key Innovation
PLoS ONE 13: e0189985.

RAJAKUMAR R, KOCH S, COUTURE M, FAVE MJ, LILICO-OUACHOUR A, CHEN T, DEBLASIS G, RAJAKUMAR A, OUELLETTE D, ABOUHEIF E.
Social Regulation of a Rudimentary Organ Generates Complex Worker Caste Systems in Ants
Nature 562: 574–577

SARTO-JACKSON I.
Wired for Social Interaction: What an Interdisciplinary Approach from Neurobiology, Evolutionary Biology, and Social Education Work Can Teach Us about Psychological Trauma
International Journal of Child, Youth and Family Studies 9: 9–30

SARTO-JACKSON I.
Out of Order: Function and Malfunction in the Biological and Biomedical Sciences
Biological Theory 13: 1–3

SARTO-JACKSON I.
Time for a Change: Topical Amendments to the Medical Model of Disease
Biological Theory 13: 29–38

SCHNORR SL.
Meanings, Measurements, and Musings on the Significance of Patterns in Human Microbiome Variation
Current Opinion in Genetics & Development 53: 43–52

SCHNORR SL, CANDELA M, RAMPELLI S, TURRONI S, HENRY AG, CRITTENDEN AN.
Comment on 'Seasonal Cycling in the Gut Microbiome of the Hadza Hunter-Gatherers of Tanzania'
bioRxiv (preprint). https://doi.org/10.1101/284513

SCHWITZGEBEL E, HUANG LT-L, HIGGINS A, GONZALEZ-CABRERA I.
The Insularity of Anglophone Philosophy: Quantitative Analyses
Philosophical Papers, special issue on Linguistic Injustice 47: 21–48

SCOTT NA, STRAUSS A, HUBLIN J-J, GUNZ P, NEUBAUER S.
Covariation of the Endocranium and Splanchnocranium during Great Ape Ontogeny
PloS one 13: e0208999

VÁSÁRHELYI ZA.
The Evolution of Cooperation and Division of Labour in Structured Populations. Three Individual Based Models
PhD Thesis, Eötvös Loránd University

70 WIDDER S.
The Evolution of Biological Interactions and Emergent Community Functions. From Conceptual Model Building to Big Data Analysis
Habilitation Thesis, University of Vienna

ZIMM R.
On the Development of the Turtle Scute Pattern and the Origins of Its Variation
PhD Thesis, University of Helsinki

4.3 Forthcoming Publications

BETZLER RJ.
Finding Empathy: How Neuroscientific Measures, Evidence, and Conceptualisations Interact
International Journal of Philosophical Studies

CARLS-DIAMANTE S.
Out on a Limb? On Multiple Cognitive Systems Within the Octopus Nervous
System Philosophical Psychology

DiFRISCO J.
Kinds of Biological Individuals: Sortals, Projectibility and Selection
The British Journal for the Philosophy of Science

DiFRISCO J.
Homology and Homoplasy of Life Cycle Traits
In: Perspectives on Evolutionary and Developmental Biology (Fusco G, ed), pp 71-82
Padova University Press: Padova

DiFRISCO J.
Interdisciplinarity, Epistemic Pluralism, and Unificationism
Studies in History and Philosophy of Science Part C
(Essay review of Lidgard and Nyhart (eds.) Biological Individuality)

DiFRISCO J.
Developmental Homology
In: Evolutionary Developmental Biology: A Reference Guide (Nuño de la Rosa García L, Müller GB, eds)
Springer: Cham

DiFRISCO J, MOSSIO M.
Diachronic Identity in Complex Life Cycles: An Organizational Perspective
In: Biological Identity. Perspectives from Metaphysics and the Philosophy of Biology (Meincke AS, Dupré J, eds)
Routledge: London

GAWNE R, NIJHOUT HF.
Expanding the Nymphalid Groundplan's Domain of Applicability: Pattern Homologies in an Arctiid Moth
Biological Journal of the Linnean Society

GRUNSTRA ND, ZACHOS FE, HERDINA AN, FISCHER B, PAVLICEV M, MITTEROECKER P.
Humans as Inverted Bats: A Comparative Approach to the Obstetric Conundrum
American Journal of Human Biology

HONAP TP, SANKARANARAYANAN K, SCHNORR SL, OZGA AT, WARINNER C, LEWIS CM.
Biogeographic Study of Human Gut Associated crAssphage Suggests Impacts from Industrialization and Recent Expansion
bioRxiv

RAFIQI AM, RAJAKUMAR A, ABOUHEIF E.
Duplication and Divergence of Germplasm Facilitates a Major Evolutionary Transition in Ants
Nature

SMALDINO PE, PALAGI E, BURGHARDT GM, PELLIS SM.
The Evolution of two Types of Play
Behavioral Ecology

4.4 Journal *Biological Theory*

Volume 13, Issue 1:

SARTO-JACKSON I.
Out of Order: Function and Malfunction in the Biological and Biomedical Sciences

ARDERN Z.
Dysfunction, Disease, and the Limits of Selection

NORDENFELT L.
Functions and Health: Towards a Praxis-Oriented Concept

ROUX E.
Function, Dysfunction, and Normality in Biological Sciences

SARTO-JACKSON I.
Time for a Change: Topical Amendments to the Medical Model of Disease

BONNIN T, HERNÁNDEZ-CHÁVEZ P, HLADKY M, SUÁREZ PASCAL CD.
Function and Malfunction in the Biological and Biomedical Sciences and Social Sciences • Fourth European Advanced Seminar in the Philosophy of the Life Sciences, Klosterneuburg, Austria, 5–9 September 2016

ROUGHGARDEN J, GILBERT SF, ROSENBERG E, ZILBER-ROSENBERG I, LLOYD EA.
Holobionts as Units of Selection and a Model of Their Population Dynamics and Evolution

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IJÄS T.
Design Under Randomness: How Variation Affects the Engineering of Biological Systems

MANN SF.
Attribution of Information in Animal Interaction

NECO LC, JAPYASSÚ HF, EL-HANI CN, CHÂLINE N.
From Classificatory to Quantitative Concepts in the Study of Sociality in Animals: An Epistemological View

PEDROSO M.
The Impact of Population Bottlenecks on the Social Lives of Microbes

ROGNINI P.
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Volume 13, Issue 4:

D'ERRICO F, COLAGÈ I.
Cultural Exaptation and Cultural Neural Reuse: A Mechanism for the Emergence of Modern Culture and Behavior

LIU KE.
Rethinking Causation in Cancer with Evolutionary Developmental Biology

ROES F.
The Curious Case of the Spanish Flu

SUMAN F.
Integrative and Separationist Perspectives: Understanding the Causal Role and Cultural Transmission in Human Language Evolution

VEGA F.
A Critique of Barbieri's Code Biology Through Rosen's Relational Biology: Reconciling Barbieri's Biosemiotics with Peircean Biosemiotics

4.5 Scientific Presentations

ABOUHEIF E.
What Supersoldier Ants Teach Us about the Origin and Emergence of Complex Biological Systems
IST Austria, Klosterneuburg

ABOUHEIF E.
What Soldier Ants Teach Us About Development and Evolution
Universite de Lyon (IGFL) Lyon

ABOUHEIF E.
The Symbiosis between Ants and Bacteria Reveals Developmental Steps to Major Evolutionary Transitions
American University of Cairo

ABOUHEIF E.
Obligate Endosymbiosis in Ants Reveals Developmental Steps to Major Evolutionary Transitions
"Symbiosis" Workshop, University of Vienna

BETZLER RJ.
Should We be Eliminativists about Empathy?
Department of Psychology, University of Vienna

BONS P, BAUER C, BOCHERENS H, MENÉNDEZ LP, UHL A, WISSING C.
Pitfalls and Opportunities in Pinpointing the Origin of Modern Humans. A Numerical Study
VIII Meeting of the Evolutionary Society of Human Evolution, Faro

CARLS-DIAMANTE S.
Armed with Information: Chemical Self-recognition in the Octopus
Minimal Cognition 2: Agency, Complexity, and the Roots of Cognition. University of Wollongong, Wollongong

CARLS-DIAMANTE S.
Armed with Information: Chemical Self-recognition in the Octopus
Thursday Philosophy Seminar, Australian National University, Canberra

DiFRISCO J.
Developmental Homology and the De-coupling of Levels of Evolution
Society for Metaphysics of Science 4, University of Milan

FISCHER B.
Kindsköpfe und evolutionärer Pfusch
Science and Nature Day, PH Burgenland, Eisenstadt

FISCHER B.
Enge Becken, große Köpfe und die menschliche Evolution
Perinataldialog, Medical University of Vienna

GAWNE R.
The Arctiid Archetype: A New Lepidopteran Groundplan
8th International Conference on the Biology of Butterflies. National Center for Biological Sciences, Bangalore

GAWNE R.
The Development and Evolution of Wing Patterning in the Bella Moth *Utetheisa ornatrix*
Joint NUS-HU Workshop on Patterning and Timing in Development and Evolution. Humboldt University, Berlin

GONZALEZ-CABRERA I.
Political Orientation and Folk Metaethical Intuitions about the Perceived Objectivity and Relativity of Moral Judgments
Workshop on Folk Metaethics: Empirical and Philosophical Perspectives, University of Graz

GONZALEZ-CABRERA I.
Perceiving Good and Evil
Harvard Philosophy Department Talk-Shop, Harvard University

MENÉNDEZ LP, HARVATI K, RADEMAKER K.
Reconstrucción virtual y análisis craneométrico de un individuo del Holoceno temprano de Cuncaicha (Perú): implicancias para la diversificación humana en Sudamérica
9th Simposyum El Hombre temprano en América, Necochea

MÜLLER GB.
Die Evolution der Evolutionstheorie
Katholischer Akademikerverband Wien

MÜLLER GB.
Epigenesis, Epigenetics, and the Extended Synthesis
Spineto Epigenetics Conference, Spineto

MÜLLER GB.
Conceptual Contributions of EvoDevo to an Extended Evolutionary Synthesis
Evo-Devo: A New Discipline of Life Sciences? Collège de France, Paris

MÜLLER GB.
On the Future of Evolution
Opening Ceremony of the Research Center for Evolutionary Integration, Universidad Autónoma de Madrid, Madrid

MÜLLER GB.
Do We Need an Extended Evolutionary Synthesis?
Institute for Philosophy in Biology and Medicine, University of Bordeaux

NICHOLSON DJ.
What Can the History of Theoretical Biology Tell Us about Its Future?
Theoretical Biology Today: A Symposium in Honour of Gerd Müller, University of Vienna

NICHOLSON DJ.
Process Metaphysics and Biology
Departmental Seminar, University College Cork

RAJAKUMAR A, DING J, ABOUHEIF E.
The DNA Damage Response Pathway Reinforces Social Harmony in Ant Societies
XI European Congress of Entomology, Naples

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Gaston Bachelard, Albert Flocon und der Rhythmus der Elemente

ZiF-AG: Rhythmus, Zeit, Form – ein Konzept der Künste und ihrer Wissenschaften um 1900 und seine temporalen und kulturellen Implikationen
Center for Interdisziplinary Research, University of Bielefeld

RHEINBERGER H-J.

Dimensionen der Repräsentation in der wissenschaftlichen Praxis

Formen der (Re)Präsentation fachlichen Wissens, Interdisciplinary Conference, Christian-Albrechts-University, Kiel

SARTO-JACKSON I.

Using Cognitive Biology to Tackle Individuality

SOPhiA Conference: Biological Individuality and Other Issues in Contemporary Philosophy of Biology, Salzburg

SARTO-JACKSON I.

The Extended Evolutionary Synthesis and Its Role in the Neuro- and Psychological Sciences

Causality in the Neuro and Psychological Sciences, University of Antwerp

SARTO-JACKSON I.

Whatever Happened to Homeorhesis?

First Meeting of the PhilInBioMed International Network, University of Bordeaux

SARTO-JACKSON I.

Lecture Series in 'Cognitive Biology'

Interdisciplinary Curriculum of the Comenius University, Bratislava

SARTO-JACKSON I.

Biocognition: Knowledge Accumulation in Biological Systems

MeiCogSci Lecture Series, University of Vienna

SARTO-JACKSON I.

Warum ich weiß, was Du fühlst

Brain Awareness Week 2018, Medical University of Vienna

SCHNORR SL.

Ancient Foods, Fiber, and Bugs: Exploring the Ancient Human Microbiome to Understand Human Nutrition during Evolution

Department of Pharmacy and Biotechnology, (FaBiT) University of Bologna

SCHNORR SL.
Can Honey Consumption Be Detected from Metagenomic Gut Microbiome Data?
American Association of Physical Anthropologists (AAPA), Austin

SCHNORR SL.
Tracing the Impact of Diet in Human Evolution Using Physiological and Behavioral Roadmaps
Department of Anthropology, Washington State University

SYROWATKA C.
Evolvability and Robustness: A Paradox in Evolutionary Theory
Seminar of the Department of Theoretical Biology, University of Vienna

SYROWATKA C.
Evolvability and Robustness: A Paradox in Evolutionary Theory
EvoLunch IST Austria

WINDHAGER S, BOOKSTEIN FL, MÜLLER GB, SCHAEFER K.
Morphometric Integration of Facial Shape: A Possible Bridge between Evo-Devo and Human Behavioral Biology
7th Meeting of the European Society for Evolutionary Developmental Biology, Galway

WINKLER V, MÜLLER GB, METSCHER B.
3D Cell Proliferation Patterns in Developing Bird Limbs
7th Meeting of the European Society for Evolutionary Developmental Biology, Galway

YILMAZ O.
'Individual Plant' Why it Matters?
SOPhiA Conference: Biological Individuality and Other Issues in Contemporary Philosophy of Biology, Salzburg

YILMAZ O.
What is 'Individual Plant'?
EENPS 2018, 2nd Conference of East European Network for Philosophy of Science, Bratislava

Further Activities

5

Many activities of the KLI exceed the scientific core agenda. Some representative activities are listed here.

5.1 Arts & Science Events

Exhibition & Performance "Living Structure"

5 October 2018
KLI Klosterneuburg

Artist: Cornelia Caufmann
Performance: Cornelia Caufmann & Tobias Leibetseder

Topic

I think the idea of a 'finished' picture is a fiction. I think a man spends a whole lifetime painting one picture or working on one piece of sculpture.

Barnett Newman (1905 – 1970)

Mir scheint, dass dieses Statement von Barnett Newman als eine sehr korrekte Beschreibung des künstlerischen Prozesses von Cornelia Caufmann anzusehen ist. Verbringt man ein ganzes Leben, um an einem einzigen Werk zu arbeiten…? – Tatsächlich, mit etwas Abstand betrachtet, klingt damit auch eine Überhöhung an, die das künstlerische Schaffen heraushebt, wenn man das eine Werk dem großen Ganzen, das ein Leben ausmacht, gegenüberstellt; wenn man das große Ganze reduziert oder es in das eine Werk verpackt. Peter Weibel hat in diesem Zusammenhang gesagt, dass die Geschichte der Malerei auch immer eine Geschichte ihres Endes – also ihrer Auflösung – ist. U.a. deshalb, weil sie ein Ziel erreicht oder sich erschöpft hat.

'Onement' ist der Name einer Serie von monochromen Bildern von Barnett Newman, die 1948 – 1953 entstand. Mit diesem erfundenen Begriff sind auch Bedeutungen verbunden bzw. assoziiert wie movement / Bewegung, wie moment / Augenblick, wie monument / Denkmal, wie ornament / Verzierung, aber etwa auch atonement / so etwas wie Buße, tätige Reue, die in diesem Fall von Künstler und Künstlerin geleistet wird.

Zu allererst verweist diese Worterfindung aber auf eben diese Singularität, diese Einzigkeit, die sich weniger aus einem Prozess ergibt, sondern sich genuin als Prozess entwickelt. Ein Prozess mit offenem Ende, wie Peter Weibel anmerkt.

Es erscheint mir ganz natürlich, wenn ich diese Überlegungen als Gedanke auch auf die seriellen, iterativen Arbeiten von Cornelia Caufmann anwende. Der Prozess ist ein ganz wesentliches Element, ein Agens, ein Antrieb, aus dem heraus sie mit Tusche, Pinsel, Feder auf verschiedenen, sehr ausgewählten Papieren, einzelnen Blättern und in gebundenen Büchern arbeitet.

Ein meditativer Vorgang auch und daher auch ein erkenntnisgewinnender Prozess, der in Gang gesetzt wird, der Rückkoppelungen mit den künstlerischen Ergebnissen und der Künstlerin als Person zeigt und erlaubt.

'SPECIES' –
Holzskulpturen aus den Serien SPECIES und IKONEN der Gegenwart

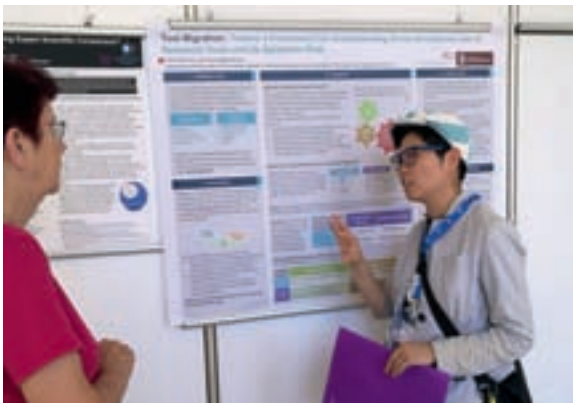
29 November 2018
KLI Klosterneuburg

Artist: Andreas Mathes

Ausstellung

SPECIES (spe:tsiɛs oder ʃpe:tsiɛs, lat. „Anblick", „Gestalt", „Erscheinung")
Vernissage Donnerstag, 29. November ab 18 Uhr
Begrüßung: Prof. Gerd B. Müller, Kulturstadtrat Konrad Eckl
Musik: Raphael Leitner & Alexander T.T. Mueller

5.2 Prizes



Poster Prize
Chia-Hua LIN

30 June – 2 July 2018
Ghent University

Organization:
Society for Philosophy of Science in Practice (SPSP)

KLI writing-Up fellow Chia-Hua Lin received the 2018 Poster Prize of the Society for Philosophy of Science in Practice (SPSP) at the Seventh Biennial Conference in Ghent for her work on 'Tool Migration: Toward a Framework for Understanding the Epistemic risks associated with the Cross-disciplinary use of Research Tools.'

5.3 Acknowledgment

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KLI

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Mai 2019

Images

Photos by Wolfgang Bledl

Archeological artifacts from the excavation site
of the KLI in Klosterneuburg

Image 1: *Vessels, Iron Age*
Image 2: *Loom weight, Neolithic Period*
Image 3: *Bone object, Neolithic Period; bone object, Bronze Age; & iron sickle, Late Middle Age*
Image 4: *Pottery figurine & tripod vessel, Late Middle Age*
Image 5: *Spindle whorle, stone ball & bone ring, Late Middle Age*
Image 6: *Handled vessel, Late Middle Age; embellished jug, Neolithic Period*


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