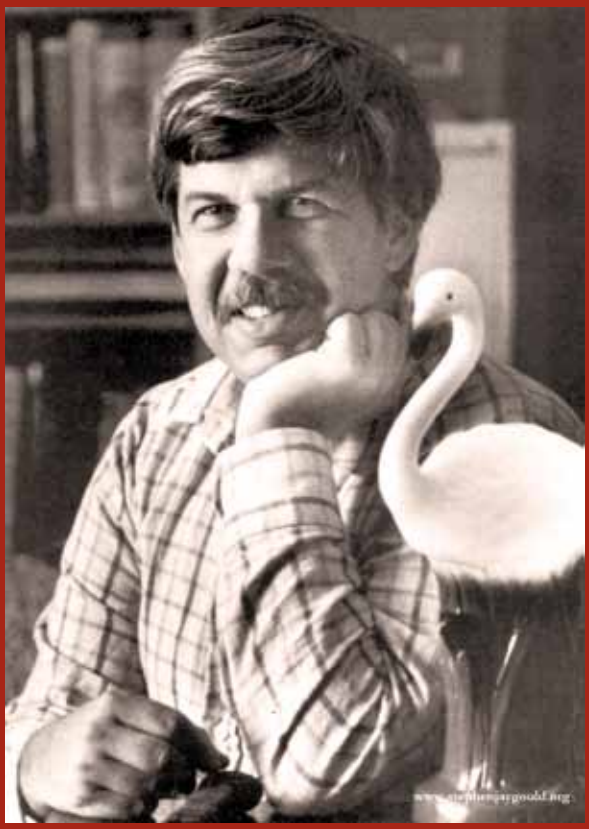
STEPHEN J. GOULD'S LEGACY
NATURE, HISTORY, SOCIETY

Venice, May 10–12, 2012

Organized by Istituto Veneto di Scienze, Lettere ed Arti
in collaboration with Università Ca' Foscari di Venezia



ABSTRACTS

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Istituto Veneto di Scienze, Lettere ed Arti
Maria Turchetto, Università Ca' Foscari di Venezia

Invited speakers

Guido Barbujani, Università degli studi di Ferrara
Marcello Buiatti, Università degli studi di Firenze
Andrea Cavazzini, Université de Liège
Niles Eldredge, American Museum of Natural History, New York
T. Ryan Gregory, University of Guelph
Alberto Gualandi, Università degli studi di Bologna
Elisabeth Lloyd, Indiana University
Giuseppe Longo, CNRS; École Normale Supérieure, Paris
Winfried Menninghaus, Freie Universität Berlin
Alessandro Minelli, Università degli studi di Padova and
Istituto Veneto di Scienze, Lettere ed Arti
Gerd Müller, Konrad Lorenz Institute, Vienna and
Istituto Veneto di Scienze, Lettere ed Arti
Marco Pappalardo, McGill University, Montreal
Telmo Pievani, Università degli studi di Milano Bicocca and
Istituto Veneto di Scienze, Lettere ed Arti
Klaus Scherer, Université de Genève
Ian Tattersall, American Museum of Natural History, New York

May 20, 2012 will be the tenth anniversary of Stephen Jay Gould's death. Palaeontologist at the Museum of Comparative Zoology, Harvard University, eminent evolutionary biologist, science writer, science historian and opinion maker, Gould gave us an extended and revised version of the theory of evolution, his "Darwinian pluralism", which is today an excellent frame for understanding the scientific advancements in many evolutionary fields. His anticipating intuitions about the conjunction of evolution and development, the role of ecological and biogeographical factors in speciation, the need for a multi-level interpretation of the units of selection, the interplay between functional pressures and internal constraints in processes like exaptation, are fruitful current lines of experimental research today. Even his pungent and sometimes very radical controversies against the progressive representations of evolution (especially human evolution), the pan-selectionist and gene-centered view of natural history, or the adaptationist "just-so-stories", have left their mark in contemporary biology. Gould's histories of nature were explorations in the nature of history, with wider cultural and philosophical implications, like his crucial concept of contingency. In the wonderful location of "Istituto Veneto di Scienze, Lettere ed Arti" in Venice, the town of Gould's "spandrels of San Marco", an international panel of scientists and philosophers – including Gould's closest friends and colleagues like Niles Eldredge, Elisabeth Lloyd and (in video) Richard Lewontin – will discuss his evolutionary and anthropological legacy, his idea of science as a complex rational enterprise, evolving itself and immersed in human society, his proposal for a methodology in historical sciences, and his unmistakable style of writing and argumentation, overcoming the boundaries between science, literature and art. In Gould scientific research and communication of science were two fields of inquiry strictly related by the idea that science is a high expression of human curiosity and culture.

PROGRAM

Istituto Veneto di Scienze, Lettere ed Arti
May 10, 2012

9.00 a.m.
Opening of the meeting
9.15 a.m.
Introduction
Telmo Pievani, Università degli studi di Milano Bicocca and Istituto Veneto di Scienze, Lettere ed Arti
Ten years without Stephen J. Gould: the scientific heritage
9.45 a.m.
First session:
Chair **Telmo Pievani**, Università degli studi di Milano Bicocca and Istituto Veneto di Scienze, Lettere ed Arti
9.45 a.m.
Richard C. Lewontin, Harvard University (video)
10.00 a.m
Niles Eldredge, American Museum of Natural History, New York
Stephen Jay Gould in the 1960s and 1970s, and the Origin of "Punctuated Equilibria"
10.45 a.m.
Coffee break
11.00 a.m.
Second session
Chair: **Marco Ferraguti**, Università degli studi di Milano
11.00 a.m
Alessandro Minelli, Università degli studi di Padova and Istituto Veneto di Scienze, Lettere ed Arti
Individuals, hierarchies, and the levels of selection. A chapter in Gould's evolutionary theory
11.45 a.m.
Elisabeth Lloyd, Indiana University
Gould and adaptation: San Marco 33 years later

12.30 p.m.
Lunch
2.30 p.m.
Third Session
Chair: **Alessandro Minelli**, Università degli studi di Padova and Istituto Veneto di Scienze, Lettere ed Arti.
2.30 p.m
Gerd Müller, Konrad Lorenz Institute, Vienna and Istituto Veneto di Scienze, Lettere ed Arti
Beyond Spandrels: S.J. Gould, EvoDevo, and the Extended Synthesis
3.15 p.m.
T. Ryan Gregory, University of Guelph
A Gouldian view of the genome
4.00 p.m.
Coffee break
4.15 p.m.
Fourth session
Chair: **Elena Gagliasso**, Sapienza Università di Roma
4.15 p.m
Giuseppe Longo, CNRS, CREA, École Polytechnique et CIRPHLES, École Normale Supérieure, Paris
Randomness increases biological organization: a mathematical understanding of Gould's critique of evolutionary progress
5.00 p.m.
Marcello Buiatti, Università degli studi di Firenze
Biological complexity and punctuated equilibria

Istituto Veneto di Scienze, Lettere ed Arti
May 11, 2012

9.00 a.m.
Fifth session:
Chair: **Giorgio Manzi**, Sapienza Università di Roma
9.00 a.m.
Ian Tattersall, American Museum of Natural History, New York
Steve Gould's intellectual legacy to anthropology

9.45 a.m.

Guido Barbujani, Università degli studi di Ferrara
Mismeasuring man thirty years later

10.30 a.m.

Coffee break

10.45 a.m.

Sixth session
Chair: **Bernardino Fantini**, Université de Genève

10.45 a.m.

Klaus Scherer, Université de Genève
Affect bursts as evolutionary precursors of speech and music

11.30 a.m.

Winfried Menninghaus, Freie Universität Berlin
Darwin's theory of music, rhetoric and poetry. A (partly) Gouldian perspective

12.45 a.m.

Lunch

2.30 p.m.

Seventh session
Chair: **Maria Turchetto**, Università Ca' Foscari di Venezia

2.30 p.m.

Alberto Gualandi, Università degli studi di Bologna
The Gould effect. Neoteny, exaptation and human sciences

3.15 p.m.

Andrea Cavazzini, Université de Liège
Beyond (and without) the invisible hand. Transfer of concepts between economics and evolutionary theory

4.00 p.m.

Coffee break

4.15 p.m.

Marco Pappalardo, McGill University, Montreal
Stephen Jay Gould's hypothesis on neoteny in humans

5.00 p.m.

Closure of the meeting

Università Ca' Foscari di Venezia

May 12, 2012

9.00 a.m.

Round table on communication of science

Chair: **Gianna Milano**, International School for Advanced Studies of Trieste

Angelo Aquaro, "La Repubblica"

Brunella Danesi, Associazione Nazionale degli Insegnanti di Scienze Naturali

Pietro Greco, International School for Advanced Studies of Trieste

Giorgio Narducci, Circolo Gould, Roma

Andrea Rinaldo, Università degli studi di Padova and Istituto Veneto di Scienze, Lettere ed Arti

11.00 a.m.

Coffee break

11.30 a.m.

Round table on translation into italian of "Ontogeny and Phylogeny"

Chair: **Giorgio Panini**

Andrea Cavazzini, Université de Liège

Silvia Di Cesare, École Normale Supérieure de Paris

Marco Pappalardo, McGill University, Montreal

Federica Turriziani Colonna, Sapienza Università di Roma and École Normale Supérieure de Cachan

1.00 p.m.

Lunch

May 10 – 10.00 a.m.

Niles Eldredge, American Museum of Natural History, New York

STEPHEN JAY GOULD IN THE 1960S AND 1970S, AND THE ORIGIN OF "PUNCTUATED EQUILIBRIA"

Steve Gould arrived as a beginning graduate student in the Department of Geology at Columbia University in the Fall of 1963. He was one of a group of entering students interested in paleontology, biostratigraphy, paleoecology and, of course, evolution. Though I was still an undergraduate, I was welcomed into the group – and took part in the field trips and special seminars they organized: especially one on paleontology and evolution whose main inspiration was Steve himself. Most of these students eventually went on to have distinguished careers in paleontology and related fields.

Steve's initial – and perhaps always his favorite – professional passion was morphology, development and evolution. He astonished everyone that he would devote an entire year away from his doctoral research to write an exploratory review paper on allometry – inspired by his initial work as an undergraduate with John White on the meaning of "b" in the famous equation $y=bX^k$. Steve quickly emerged as a model of the ambitious young professional, encouraging us all to develop and publish research projects – and to be bold and think about theoretical issues. He once said to me: Why wait until we are 60 before we publish on evolutionary theory? And of course he was right; indeed, sadly, he did not live beyond that very age.

The genesis of our 1972 paper *Punctuated Equilibria: An Alternative to Phyletic Gradualism* has been recounted several times, by Steve and by myself as well as by others. The definitive version, in my view, is in the newly published book *Rereading the Fossil Record* (2012) by historian David Sepkoski. I will review the essential details of our joint participation in Tom Schopf's GSA Symposium and multi-authored book, both entitled *Models in Paleobiology.* Though the gist of the concept of punctuated equilibria was developed in my 1971 paper *The Allopatric Model and Phylogeny in Paleozoic Invertebrates*, both Steve and I added material developing and extending the concept beyond its bare essentials.

What were those essentials? Simply, the juxtaposition of the concept of allopatric speciation and the empirical demonstration of stasis – the fact that

most species show little if any lasting morphological change throughout their often quite long histories. Change for the most part comes at speciation, and quiescence is the norm from then on in.

I will also add a codicil that I believe would have intrigued Steve very much: Darwin, as a young man in his late 20s, saw that the birth of species in isolation (the "allopatric speciation" of Dobzhansky and Mayr, so essential to our own notion of "punctuated equilibria") would account for the persistence of species, unchanged, "through thick formations" – in other words, our concept of "stasis". Darwin contrasted this vision with the inevitable gradual change of species – a vision of evolution he came to favor and promote, though he lacked empirical evidence for it.

With the birth of species in isolation, Darwin reckoned that adaptive change through natural selection happens rapidly in small populations. But with the passage of geological time and the inevitable environmental change that occurs, Darwin thought that natural selection would be constantly modifying entire species slowly and gradually. He could not reconcile the two views – and so his problem was deciding which was the most likely context for adaptation via natural selection to occur. He chose what we later called "phyletic gradualism".

Darwin would have liked our title, but would probably have insisted on one minor change: *Punctuated Equilibria: The Alternative to Phyletic Gradualism.*

I think Steve would have enjoyed knowing that.

May 10 – 11.00 a.m.

Alessandro Minelli, Università degli studi di Padova and
Istituto Veneto di Scienze, Lettere ed Arti

INDIVIDUALS, HIERARCHIES, AND THE LEVELS OF SELECTION. A CHAPTER IN GOULD'S EVOLUTIONARY THEORY

To follow Gould's distinction between microevolution and macroevolution, Charles Darwin's theory of natural selection was a theory about microevolution, selection being the differential reproductive success eventually obtained by individual organisms among which there is competition for access to vital

resources, reproductive partners included in the case of sexual selection. This theory implies (1) that individuals organisms can be unambiguously recognized, (2) that what identifies the level, or levels, of selection is interaction rather than inheritance, and (3) that levels of selection other than the individual organism are either nonexistent, or of little relevance.

In Darwin's gradualistic view of evolution there was no scope for macroevolution as a distinct phenomenon, as everything was explained as the product of the steadily accumulation of microevolutionary modifications. In this context, even the distinction between simple intraspecific variety and 'true' species is distinctly blurred.

However, if Gould & Eldredge's (1971, 1977) model of punctuated equilibria represents the actual, or prevailing mode of evolution, species boundaries become less arbitrary and species eventually emerge with an individuality that turns them into potential candidates to the status of units of selection.

Eventually, the individual organism and the species were singled out by Gould as the most important levels of selection, in a conventional hierarchy that begins with the gene and proceeds through the cell, the individual organism, the deme and the species, up to supraspecific clades of any age and size. In this expanded view of natural selection, the species becomes the unit of macroevolution, similar to the role played by the individual organism in microevolution.

In his magnum opus on *The Structure of Evolutionary Theory* (2002), Gould explained at length (1) why the units of selection must be identified, *contra* Dawkins, in the units of interaction rather than in the units of inheritance, (2) why Williams' (1966) and Dawkins' (1976) efforts to construe all selection processes as inherently reducible to selection at the level of gene are based on a faulty reductionism where 'bookkeeping' takes the place of causality, and (3) why the whole theory of selection (and evolution) can be developed by reference to a single hierarchy of levels, or units, of selection, rather than to parallel hierarchies of units of interaction and inheritance as suggested by Eldredge (1985) and Williams (1992).

In a couple of passages, Gould (2002) admitted that "the current evolutionary hierarchy in styles of individuality arose both historically and contingently", that "nature presents some exception to the principle of a fully nested hierarchy for evolutionary individuals", and cited with full approval Buss' (1987) insightful remark, that "the major features of evolution were shaped during periods of transition between units of selection".

Recent advances in fields as diverse as symbiosis, lateral gene transfer and

the evolution of development suggest that to shoehorn biological systems into the levels of the so-called evolutionary hierarchy is an oversimplification of the complexity of many systems and, especially, of the way they are generated throughout ontogeny. Even the concept of individual organism, as a physically independent unit with its precise origin in time does not apply so easily and universally as generally accepted. Evolution, indeed, is not simply matter of change of 'individuals,' at any and all levels of the gene-to-clade hierarchy, but also matter of change of the units (or levels) of selection and of the rules of change themselves.

May 10 – 11.45 a.m.

Elisabeth Lloyd, Indiana University

GOULD AND ADAPTATION: SAN MARCO 33 YEARS LATER

Stephen J. Gould's concern for the wide variety of explanations for evolutionary change was one of his chief intellectual contributions. His many essays in *Natural History* magazine illustrating historical, correlational, byproduct, and phyletic evolutionary explanations, which he contrasted with adaptationist explanations, informed the public and evolutionists of the importance of nonadaptive approaches. Gould's arguments regarding the risks of adaptationist thinking were summarized in one of his most famous papers, "The Spandrels of San Marco", which he co-authored with Richard C. Lewontin, named in honor of Venice's own most gloried basilica. In this talk, I take a more formal approach to discussing his analysis of evolutionary explanations, now 33 years later.

My analysis rests on the logic of research questions, and contrasts what I have borrowed from recent philosophers, and call a "methodological adaptationist" approach, to the "evolutionary factors" approach. In the former, the key research question is: "What is the function of this trait?" while in the latter, the research question is: "what evolutionary factors account for the form and distribution of this trait?" I use my case study on the evolution of the female orgasm, which Gould defended in his column, and was one of his favorite examples, to illustrate how the methodological adaptationist approach

can lead scientists astray. (Reports of the demise of the byproduct account, based on recent poorly-designed twin studies, are greatly exaggerated). Biases induced by methodological adaptationism have led biologists to fail to see the byproduct explanation as a distinct positive causal hypothesis, and as one that can have evidence in its favor. They therefore fail to compare the byproduct hypothesis against an adaptive one with regard to the evidence. Perhaps, then, it is past time to take Gould's advice, and reevaluate whether methodological adaptationism is truly as benign as it is commonly assumed to be.

May 10 – 2.30 p.m.

Gerd Müller, Konrad Lorenz Institute for Evolution and Cognition Research, Altenberg and Istituto Veneto di Scienze, Lettere ed Arti

BEYOND SPANDRELS: S.J. GOULD, EVODEVO, AND THE EXTENDED SYNTHESIS

Today, the origin of Evolutionary Developmental Biology (EvoDevo) is usually associated with a methodological breakthrough, namely the isolation of regulatory genes and the visualization of their expression patterns in developing embryos, opening up the comparative study of gene regulation in diversified organismal lineages. The preceding conceptual considerations that initiated the theoretical integration of developmental biology into evolutionary theory are mostly neglected, and so is Stephen Gould's influential role in this process. Many of the phenomena Gould addressed in his critique of the adaptationist program now find explanations in the properties of developmental systems that undergo evolutionary modification: non-gradual forms of change, biased variation, non-adaptive traits, phenotypic novelty, and others. The research field of EvoDevo has rapidly expanded and has generated numerous empirical and conceptual approaches to reveal the contributions of development in the evolution of organismal complexity. The theoretical consequences of these endeavors for the standard evolutionary framework are probably even more far reaching than foreseen by Stephen Gould. In concert with conceptual innovations emerging from other areas of evolutionary biology, EvoDevo elicits a shift in theory structure and a reinterpretation of the role of natural selection.

May 10 – 3.15 p.m.

T. Ryan Gregory, University of Guelph

A GOULDIAN VIEW OF THE GENOME

The human genome contains more than 3 billion nucleotides, only about 2% of which represent the ~20,000 protein-coding genes. By contrast, a single transposable element known as "Alu" is present in more than 1 million copies per genome, with these and other self-replicating sequences making up more than half of all human DNA. The human genome is not exceptional in this regard; in fact, there are many organisms with genomes much larger than those of humans. Even after decades of continuous study, many basic questions about genome size, structure, and evolution remain to be answered. This talk reviews some of the major questions in genome biology and the importance of incorporating concepts emphasized by Gould, including exaptation, spandrels, non-adaptive explanations, mutations of large effect, and multi-level selection.

May 10 – 4.15 p.m.

Giuseppe Longo, CNRS, CREA, École Polytechnique et CIRPHLES,
École Normale Supérieure, Paris

RANDOMNESS INCREASES BIOLOGICAL ORGANIZATION: A MATHEMATICAL UNDERSTANDING OF GOULD'S CRITIQUE OF EVOLUTIONARY PROGRESS

Physical randomness is "noise", it affects robustness, it is related to entropy growth, thus to energy dispersal or increasing disorder. In biology, randomness is an essential component of variability, thus of diversity, thus of robustness of ecosystems, species, organisms. In his long-lasting fight against any sort of finalism, J.-S. Gould proposed an elegant answer to the anthropocentric myth of increasing phenotypic organization or complexity along evolution. His answer is grounded on an insightful, but informal understanding of randomness in

the phylogenetic drift. We will hint to a rigorous mathematical approach to his fundamental ideas, by discussing as well some general questions: what is physical/biological randomness? How do they relate or differ? Can we make a difference between complexity and organization, in biology?

Some references:

Stephen J. Gould. *Wonderful Life*. Norton & Co., 1989.

Stephen J. Gould. *Full house: The spread of excellence from Plato to Darwin*. Three Rivers Pr, 1997.

Francis Bailly, Giuseppe Longo. *Mathematics and Natural Sciences. The physical singularity of life phenomena*. Imperial College, 2011 (version préliminaire en français : Hermann, 2006).

Downloadable from <http://www.di.ens.fr/users/longo>:

Francis Bailly, Giuseppe Longo. Biological Organization and Anti-Entropy. In *J. Biological Systems*, Vol. 17, No. 1, pp. 63-96, 2009.

Giuseppe Longo, Maël Montévil. From Physics to Biology by Extending Criticality and Symmetry Breakings. Special issue of *Progress in Biophysics and Molecular Biology*: 106 (2): 340-347, 2011.

Giuseppe Longo, Maël Montévil. The Inert vs. the Living State of Matter: Extended Criticality, Time Geometry, Anti-Entropy - an overview. *Frontiers in Fractal Physiology*, to appear, 2012.

Giuseppe Longo, Maël Montévil. Randomness Increases Order in Biological Evolution. Conference on *"Computations, Physics and Beyond"*, Auckland, New Zealand, February 21-24, 2012; *LNCS* volume (Dinneen et al. eds), Springer, 2012.

Giuseppe Longo, Maël Montévil, Stuart Kauffman. No entailing laws, but enablement in the evolution of the biosphere. Under revision. (arxiv.org/abs/1201.2069).

May 10 – 5.00 p.m.

Marcello Buiatti, Università degli studi di Firenze

BIOLOGICAL COMPLEXITY AND PUNCTUATED EQUILIBRIA

The Modern Synthesis and particularly population genetics, were based on a mechanistic conception of life stemming from the Mendelian conception according to which living systems were fully determined by discrete elements randomly assorted every generation. According to this conception evolution

was considered a continuous process of improvement through adaptation to the same (R.A. Fisher) or changing environment (S. Wright). The punctuated equilibria theory by Gould and Eldredge successfully challenged this conception on the ground of paleontological findings. However until the nineties of the twentieth century molecular and physiological demonstrations of processes leading to "sudden" changes in the speed of evolutionary modifications of organisms have been lacking. The present talk, after an introduction on the specific structure of biological complex systems, will discuss the dynamics of interactions between the different sources of variability and the constraints due to connections between components of living systems throughout the hierarchical organization of life inevitably leading to the changes in the speed of morphological and physiological modifications proposed by Gould and Eldredge.

May 11 – 9.00 a.m.

Ian Tattersall, American Museum of Natural History, New York

STEVE GOULD'S INTELLECTUAL LEGACY TO ANTHROPOLOGY

It is rare for an invertebrate paleontologist and evolutionary theorist to make a significant impact in the rather insular field of biological anthropology. But in this case, as in so many others, Stephen Jay Gould was a shining exception to the rule. His contribution to anthropology was to a large degree an indirect one, accomplished through his contributions to evolutionary thought in general, and more specifically through his extraordinarily effective *Natural History* columns. But it was no less forceful for that. In a field in thrall to the "hardened" (his term) Evolutionary Synthesis, Steve's energetic promotion during the 1970s of the notion of punctuated equilibria opened up new perspectives leading to a more rational appraisal of the diversity evident in the human fossil record. And his tireless advocacy of the idea that human phylogeny presents us with a "bush" rather than with a "ladder" introduced into paleoanthropological thought a powerful and compelling metaphor that continues to gather momentum. His *Natural History* columns additionally covered anthropological subjects as diverse as bipedality as the

fundamental human adaptation; the single African origin of *Homo sapiens*; the authorship of the Piltdown fossil hoax; the fate of the Neanderthals; the unity of mankind; and nature vs nurture and the relationship of race and IQ. In each of these areas, and many more, Steve's strong stances influenced the thought of professional anthropologists as well as of general readers. As a result, paleoanthropology today, and indeed anthropology in general, would be very different places without him. What's more, even a decade after his premature death, Steve continues to provoke controversy among biological anthropologists. In his book *The Mismeasure of Man*, Steve excoriated the early nineteenth century craniologist Samuel Morton as an example of science in the service of unconscious prejudice: something against which he warned scientists should always be on guard. Now Steve himself has been accused of something similar in his attack on Morton; and the ongoing furor should help keep the current generation of biological anthropologists on their intellectual toes.

May 11 – 9.45 a.m.

Guido Barbujani, Università degli studi di Ferrara

MISMEASURING MAN THIRTY YEARS LATER

Humankind has long been regarded as naturally divided into distinct groups or races, much like other animal species. Only in the second half of the twentieth century, through the work of Frank Livingstone, Richard Lewontin and Stephen Jay Gould, the race concept began to be questioned as a useful tool for understanding human biodiversity. Recent studies at the genome level have shown that we are all different, and that there are geographical patterns in human genetic variation. However, these patterns do not allow one to define clusters of biologically differentiated individuals, because each human population harbors a large share of the species' genetic diversity, and because genetic change is continuous in space, rather than interrupted by boundaries. These data explain why studies of human morphology never led to an agreement about the number and definition of human races, with proposed races numbering from 2 to 200; people can be clustered in

many ways, but variation within clusters is always large, and most alleles are cosmopolitan, i.e. present, at variable frequencies, in all continents. Race remains an important component of our social and psychological world, but envisaging our species as subdivided in genetically-differentiated groups leads to poor evolutionary inference and to errors in clinical practice.

May 11 – 10.45 a.m.

Klaus Scherer, Université de Genève

AFFECT BURSTS AS EVOLUTIONARY PRECURSORS OF SPEECH AND MUSIC

I suggest that brief non-verbal displays of emotion (affect bursts) may have been an important element in the evolution of *speech and gesture*, and, probably in parallel, of *singing and music*. After giving brief account of the evolutionary development of emotion and the nature and architecture of the human emotion system, with particular emphasis on motor expression, I will present a dynamic model of *emotion communication* distinguishing the function of expression 1) as symptom (of speaker state), 2) as symbol (of a message), and 3) appeal (to the listener), highlighting differential types of coding (biological push vs. sociocultural pull) of the expressive signs. A brief overview of research on emotion communication will provide evidence for the similarity of the expressive cues used to convey specific emotions in nonverbal vocal aspects speech and in vocal and instrumental music. In particular, some of the evidence supporting the proposal that affect bursts might have been the starting point for the joint evolution of language and music are reviewed. The proposal, and particularly the role of aesthetic emotions in poetry and music, is examined on the background of Gould's critique of "adaptationism".

May 11 – 11.30 a.m.

Winfried Menninghaus, Freie Universität Berlin

DARWIN'S THEORY OF MUSIC, RHETORIC AND POETRY. A (PARTLY) GOULDIAN PERSPECTIVE

Darwin's hypotheses regarding the evolution of music, rhetoric and poetry rely on the rich variety of evolutionary processes that Gould has brought to renewed attention against the Neo-Darwinian focus on narratives of adaptation. Stressing these aspects, the lecture makes a case for a new and more nuanced reading of Darwin's theory of the human vocal arts.

May 11 – 2.30 p.m.

Alberto Gualandi, Università degli studi di Bologna

THE GOULD EFFECT. NEOTENY, EXAPTATION AND HUMAN SCIENCES

The aim of our work is to analyze the «effects», more or less expected, that the neotenic conception of human nature, proposed by Gould in *Ontogeny and phylogeny*, produced and may still have on the human sciences. Showing that man is a primate characterized by a developmental heterochrony – a primate who «was born a year too early» and that «overexposes» his plastic and premature brain to a social and natural environment for a very long period of development – Gould has opened the way for a whole series of cognitive and neurobiological consequences, psychological and linguistic, anthropological and philosophical of which we have not yet taken full measure. As it has been done on the basis of Gould's theories by many scientists, the human brain – because of its high neotenic plasticity – can be considered as an extremely powerful device for the refunctionalization (*exaptation*) of preexisting biological structures, for purposes other than those selected by evolution. However, it is also possible to show that humans can

compensate for the disadvantages caused by this neotenic condition only by establishing a communicative relationship with himself and with the world. Through this communicative relationship, the eye and the hand, ear and voice come to entertain synesthetic intersensory relations, unavailable to any other animal, which the unusual structure of metaphorical human experience and the propositional structure of the human *logos* are based on. It follows a conception of human experience that transcends the traditional distinctions between *Naturwissenschaften* and *Kulturwissenschaften*, and that sheds new light on the condition of man in our times.

May 11 – 3.15 p.m.

Andrea Cavazzini, Université de Liège

BEYOND (AND WITHOUT) THE INVISIBLE HAND. TRANSFER OF CONCEPTS BETWEEN ECONOMICS AND EVOLUTIONARY THEORY

In many of his works, Stephen J. Gould studied the importance for Darwin of Adam Smith, whose idea of an "invisible hand" represented a model of "order from randomness" processes which would be able to subvert pre-established harmony theorized by William Paley's natural theology. In reality, Smith's "invisible hand" model is itself an harmonicistic, theologically founded, postulate, never proved by Smith to be operative in any actual economic theorem, and whose ontological optimism seemingly had a profound effect on the post-darwinian notion of Survival of the Fittest. Inversely, Gould's defence of non-reducible historical contingence in evolutionary processes should be compared to recent criticism addressed to the General Equilibrium Theory in economic theory, that is another "harmonicistic" model.

May 11 – 4.15 p.m.

Marco Pappalardo, McGill University, Montreal

STEPHEN JAY GOULD'S HYPOTHESIS ON NEOTENY IN HUMANS

Thanks to the work of a generation of scholars, the profound influence that punctuated equilibrium has had on paleoanthropology is now widely acknowledged, and it is evident even in popular literature. However, the work of Steven J. Gould contains itself a complex and articulated anthropology which, if not as popular as his macroevolutionary theories, remains after decades – we believe – extraordinarily original and potentially fecund for a variety of disciplines. In my paper, Gould's theory on human neoteny, in the version he gave in *Ontogeny and Phylogeny* (1977), will be presented in detail. In addition, I will provide a concise review of the heated debate that the theory provoked in the literature on heterochrony. Gould proposed a theory on human evolution that was, at the same time, strictly adherent to Darwinian principles, and capable of synthetizing the approach of nascent evolutionary ecology with the idea that regulatory mechanisms of development played a central role in shaping our morphology. It was the first time such an attempt had been made, and literature on human evolution currently seems to struggle to reach such a level of synthesis. In the debate that followed, two different positions clearly emerged within the field of evolutionary developmental biology: one, expressed by Gould, that from a paleontological standpoint put emphasis on the concept of form, and the other, expressed by Gould's critics, that through an embryological approach put emphasis on the concept of growth. We believe this debate to be relevant not only for anthropology, but also for the epistemological analyses of evolutionary developmental biology in general. Furthermore, we will use this rigorous representation of Gould's theory on human neoteny to challenge a trend in philosophical anthropology, and in the popular literature that stems from it, which has used the concept of neoteny to give pseudo-scientific support to a new form of anthropocentrism. Far from demonstrating our "uniqueness", neoteny is an extraordinary tool to frame many of our apparent oddities in the continuum of living processes.

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Palazzo Loredan, site of the Istituto Veneto di Scienze, Lettere ed Arti since 1892, in the litography *Wiew of the Palazzo Loredan*, by Giuseppe Kier, after Marco Moro, circa 1850. At that time, the palace hosted the Austrian Imperial Military Command of the town, whereas site of Istituto Veneto was in Palazzo Ducale.

ISTITUTO VENETO DI SCIENZE, LETTERE ED ARTI

The Istituto Veneto di Scienze, Lettere ed Arti started in 1810 as a branch of the Reale Istituto Nazionale founded by Napoleon as King of Italy. After the defeat of Napoleon, Venetia was annexed to Austrian Empire. In 1838, the Emperor Ferdinand I re-founded the Institute as "Imperiale Regio Istituto di Scienze, Lettere ed Arti". Later, in 1866, when Venetia became annexed to the Kingdom of Italy, the Institute changed its name into "Reale Istituto di Scienze, Lettere ed Arti", having been recognised of national interest, along with other five Academies of previous Italian States (Piedmont, Lombardy, Tuscany, Center Italy and Southern Italy). In 1945, at the end of the II world war and the fall of the Kingdom of Italy, the Institute acquired the present demomination: Istituto Veneto di Scienze, Lettere ed Arti.

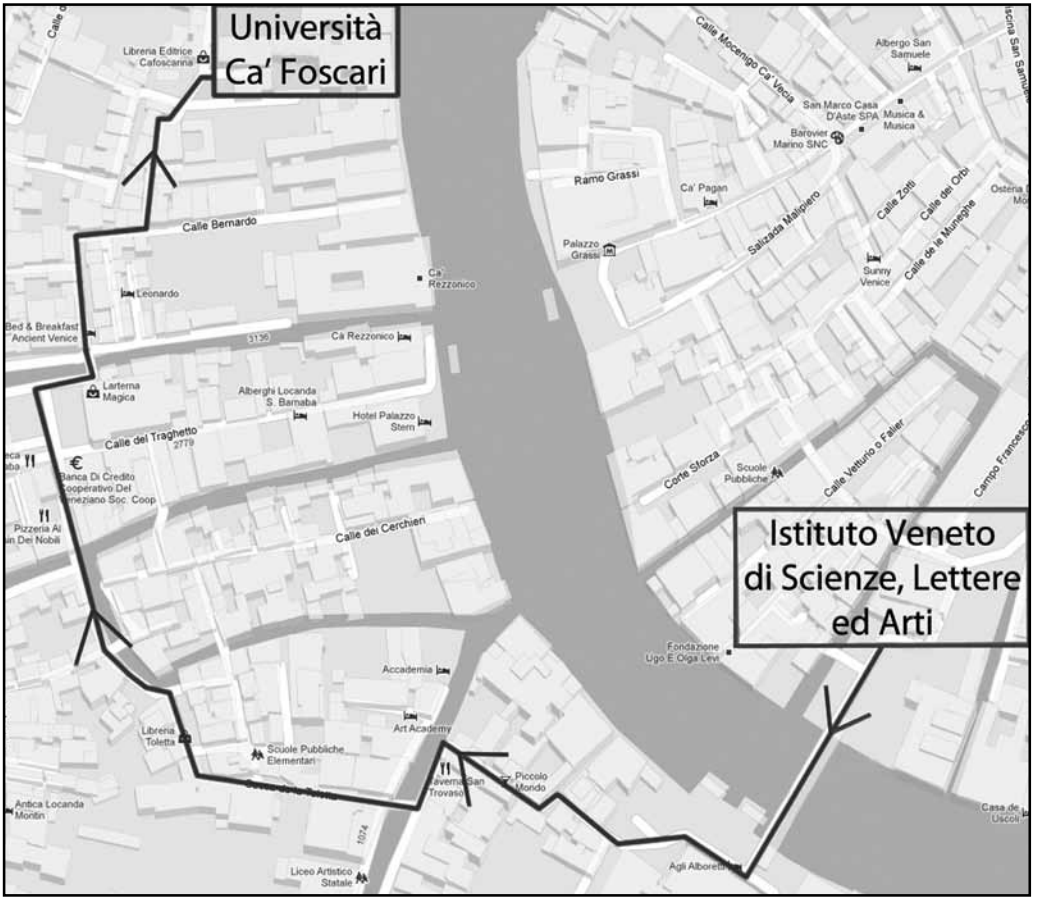
The Istituto is an Academy with two classes, one for mathematics, physics and natural sciences, the other for humanities and arts. Each class includes 40 members, 80 corresponding members and 25 foreign members. The mission of the Institute is to promote and safeguard sciences, letters and arts. Over two centuries, some of the most eminent figures of Italian and European cultural and scientific world were members of the Istituto Veneto. The Istituto is ruled by a Board of Governors (President, Vice President, Administrator and two Academic Secretaries), assisted by a Chancellor. The appointments of President and Vice President are by the Italian Minister of Culture.

Academic activities include monthly meetings of members, scientific conferences, workshops, lectures, seminars, post-graduate and post-doctorate schools. The Institute promotes scientific research projects, often in collaboration with academies, universities and research centres, at national and international level. Since its origins, the Istituto has awarded numerous prizes and scholarships, in order to encourage research. The Institute publishes a dozen of books per year, the magazine 'Atti dell'Istituto Veneto', and the periodical 'Memorie dell'Istituto Veneto'. In spite of severe losses which occurred at the end of the II world war, the library of the Institute still accounts for 200,000 volumes (OPAC catalogue of 16° century books, OPAC catalogue of publications by Istituto Veneto 1840-2000, OPAC Luigi Luzzatti's Library). Particular attention is devoted to audiovisual media, information technology and internet communications, through the website www.istitutoveneto.it

PALAZZO CAVALLI - FRANCHETTI

From the middle of XV century to XIX century, the palace hosted prestigious Venetian families: Marcello, Gussoni and Cavalli. In 1840 the palace was bought by Archduke Frederick of Austria, who started its restoration. In 1847 the building was bought by the Count of Chambord, the Legitimist France Henry V, who committed the restoration to Giambattista Meduna. In 1878 Baron Raimondo Franchetti and his wife Sarah Louise de Rothschild bought the building. An extensive restoration and renovation of the palace followed, under supervision of the architect Camillo Boito. In 1922 the palace was acquired by the Venetian Institute of Credit. Finally, in 1999 the Istituto Veneto di Scienze, Lettere ed Arti transformed Palazzo Franchetti into a site for meetings and exibitions. The total area of the palace dedicated to cultural activities is 2850 m²; it includes areas for meetings and lectures (900 m²), space for exhibitions (450 m²), and a garden (1500 m²), rich of trees and flowering plants, one of the largest among those visible from the Grand Canal. For more information see www.palazzofranchetti.it

Palazzo Cavalli, now Franchetti, on the left of the painting by Antonio Canal, called Canaletto, *Grand Canal, from Santa Maria della Carità to the Bacino di San Marco*. Circa 1730. Windsor, Royal Collection, © Her Majesty Queen Elizabeth II.



How to reach Università Ca' Foscari from Istituto Veneto di Scienze, Lettere ed Arti.

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