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Science and the Arts: Possible Intersections and New trajectories. Introduction to the Special Issue

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The history of Western thought has long been marked by the assumption that art and science belong to separate and even incompatible domains. The former, associated with subjectivity, imagination, and expressive freedom, was thought to stand at a distance from the rigor of scientific rationality; the latter, in turn, was viewed as the pursuit of universal laws and objective truths, indifferent to the singularity of aesthetic experience. This dichotomy has been reiterated in many forms, from the Renaissance opposition between the liberal and the mechanical arts to the nineteenth-century emergence of the "two cultures," and it still underlies much of our contemporary intellectual landscape. Yet such a division obscures a more complex reality. Art and science have always been in dialogue: perspective in painting developed in tandem with geometry; anatomy informed the representation of the body; theories of color oscillated between physics and artistic practice; and, more recently, psychology and neuroscience have reshaped our understanding of perception and representation. The present issue of *Foundations of Science* takes up this historical and theoretical challenge by exploring the multiple ways in which aesthetics and the sciences intersect today.

What distinguishes our current situation from earlier moments of dialogue is not merely the fact of exchange but the scope and depth of the questions at stake. Contemporary aesthetics, unlike its predecessors, is increasingly compelled to confront scientific knowledge in order to clarify its own concepts and expand its horizons. The very notions of beauty, representation, perception, and form can no longer be treated in isolation from the sciences that investigate cognition, language, biology, and mathematics. At the same time, the sciences themselves are confronted with problems that exceed empirical explanation and touch on questions of meaning, creativity, and symbolic articulation. A neurophysiological account of perception, for instance, may describe the functioning of the brain, but it cannot by itself explain why certain images move us, why forms carry symbolic resonance, or why aesthetic experience has the peculiar claim to universality that philosophers from Kant onward have emphasized.

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Conversely, art is not reducible to the spontaneous expression of genius but often employs systematic procedures, models, and experiments that resonate with scientific practice. The aim of this issue is to address this reciprocal demand: to show how art challenges science to think differently, and how science can illuminate, without exhausting, the enigmas of art.

The contributions collected here are organized around five thematic axes: (1) art and neuroscience, (2) art and biology, (3) art and mathematics, (4) art and psychology/psychoanalysis, and (5) art and language sciences. These themes provide orientation, but the essays themselves exceed rigid categories, demonstrating the extent to which the boundaries between art and science are porous and continually redefined. Together, they map a shared terrain where epistemological, methodological, and creative concerns intersect. Rather than presenting a fusion of disciplines, this volume offers a constellation of perspectives that reconfigure the dialogue between art and science, opening it to new conceptual possibilities.

The opening essay by **Luca Taddio**, *Art and Psychology: A Phenomenological Inquiry into the Nature of Pictorial Representations*, exemplifies the value of revisiting classical theories of perception in light of aesthetic practice. Taddio stages a dialogue between Merleau-Ponty's phenomenology and Gestalt psychology, two traditions that, when critically combined, reveal the existential depth of perception. By analyzing works of Cézanne and Magritte, he argues that pictorial representation is not reducible either to resemblance or to cultural codes, but arises from conditions of appearance that unite perception and world. Painters do not imitate reality; they re-create it, opening new modes of visibility.

A broader theoretical scope is adopted by **Damiano Cantone** in *Universal Beauty: An Intersection of Language*, *Aesthetics*, *and Neuroscience*. Anchored in Kant's *Critique of Judgment*, the essay interrogates contemporary attempts to naturalize aesthetics through neuroscience and evolutionary biology. Cantone shows that aesthetic judgment cannot be explained by neural mechanisms or adaptive functions alone, but must be understood as an emergent phenomenon rooted in the interplay between biology, cognition, and language. Beauty, on this account, is not a property of objects but a harmonious state that reflects both subjective feeling and universal communicability. By revisiting Kant in light of contemporary science, Cantone highlights the enduring relevance of philosophy for understanding the complexity of aesthetic experience.

The theme of mathematics and morphogenesis is developed by **Alessandro Sarti** in *Intensities and Morphogenetical Events*. Here, differential calculus and catastrophe theory serve as models for understanding the dynamics of form. Sarti distinguishes between nomological laws, structural morphodynamics, and post-structural recompositions, emphasizing how intensive differentials generate the very possibility spaces within which forms emerge. His proposal culminates in the notion of the virtual as a plane of differential composition, extending mathematical thinking into the domain of imagination and aesthetics. In this way, the essay demonstrates how mathematics and art converge around a shared concern with genesis, transformation, and becoming.

Turning to the psychoanalytic tradition, **Silvia Capodivacca** in *Leonardo: Interminable Analysis of an Unfinished Mastery* revisits Freud's classic study of Leonardo da Vinci. While acknowledging Freud's pioneering attempt to link creativity and repression, she critiques the reduction of Leonardo's life and work to sublimated sexuality. Instead, she foregrounds Leonardo's boundless curiosity, interdisciplinary vision, and fragmentary working style as essential to his genius. Leonardo's "unfinished" legacy is thus not a limitation but a dynamic mode of creation, perpetually open-ended and interdisciplinary. Capodivacca's analysis exemplifies how psychoanalysis can be rethought as a resource for aesthetics when approached critically and historically.

The relation between neuroscience and art is further scrutinized in **Ian Verstegen's** *A New Priority for Neuroaesthetics Research: The Reifying View*. Verstegen challenges the superficiality of many current neuroaesthetic models, which oscillate between naïve realism and unexplained parallelism. Drawing inspiration from Arnheim, he calls for a more radical "reification function" in which perceptual formation itself is understood as expressive and symbolic. Such a framework, he argues, would enable neuroaesthetics to move beyond descriptive addenda and to address the profundity of art in its own right.

A complementary perspective on the theory of perception is offered by **Yang Yang and Wei Wu** in *The Interface Theory of Perception: A Review and Discussion*. Their paper revisits Donald Hoffman's *Perceptual Interface Theory*, situating it within both classical philosophy (Kant, James) and contemporary debates in neuroscience and quantum mechanics. Through a rigorous analysis of Hoffman's interface metaphor and PDA loop model, the authors explore the ontological and epistemological tensions between adaptive utility and representational truth. They assess the theory's implications for the "hard problem of consciousness," its challenge to functionalist reductionism, and its attempt to bridge the explanatory gap between mind and body through an ontological revision of perception. At the same time, they offer a critical evaluation from three angles: the coherence of defining perception without truth-aptness, the metaphysical assumptions of the interface metaphor, and the possibility of intersubjective objectivity within a non-realist framework. The essay thus clarifies both the philosophical significance and the unresolved challenges of Interface Theory, illuminating how evolutionary and computational models of perception can enrich — but also unsettle — aesthetic and epistemological reflection.

A strikingly original approach is found in **Ilaria Perissi's** *From Yarns to Canvas: Modelling as a Path to Knowledge in Van Gogh's Creative Process*. By examining Van Gogh's use of yarns to experiment with color relations, Perissi reveals how artistic creativity can adopt systematic, model-based procedures akin to those of science. This perspective challenges the myth of the "tormented genius" and reframes creativity as a process involving persistence, structure, and methodology. Modelling, she suggests, is a universal cognitive tool that bridges the arts and sciences, exemplifying the spirit of interdisciplinarity at the heart of this volume.

In *Perturbance and Animation. The Removed in Psychoanalysis*, **Marcello Barison** explores the role of repression and its aesthetic returns. By analyzing how perturbance functions as both a destabilizing force and a principle of animation, he argues that art provides a privileged space for the reappearance of the "removed." Artistic forms thus mediate between unconscious processes and cultural expression, highlighting the continued relevance of psychoanalysis for understanding aesthetic experience.

Finally, **Seyed Kiarash Sadat Rafiei** and **Mahsa Asadi Anar**, in *Art and Individuation: A Processual Framework for Aesthetic Form and Perception*, propose a processual account of aesthetics informed by the philosophy of individuation. Rather than conceiving form as a fixed entity, they argue that aesthetic phenomena arise through continuous processes of individuation, in which perception, culture, and materiality co-constitute one another. Their framework underscores the capacity of art to generate new forms of subjectivity and meaning, situating aesthetics within a dynamic ontology of transformation.

Taken together, these essays illustrate the extraordinary fertility of the encounter between art and science. They show that the relationship is not one of simple application, where scientific findings are used to explain artistic phenomena, nor one of aestheticization, where art merely illustrates science. Instead, it is a reciprocal engagement in which each field challenges the assumptions of the other. Art exposes the limits of scientific explanation by insisting on the irreducibility

of meaning, imagination, and form; science enriches aesthetics by providing tools, models, and insights that transform philosophical reflection. The result is not a hybrid discipline but a shared space of problematization, where concepts and methods are tested, reconfigured, and renewed.

The present issue of *Foundations of Science* thus aims to demonstrate that the future of aesthetics cannot be thought apart from the sciences, and that the sciences themselves are incomplete without a consideration of the aesthetic dimension of human experience. To rethink perception, beauty, form, and representation today means to confront both the empirical and the symbolic, both the biological and the cultural, both the universal and the singular. The essays collected here bear witness to this task, offering not only new perspectives on art and science but also a renewed sense of their profound interdependence.

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