Introduction to the second special issue on biological mentality

Kenneth Augustyn
Michigan Technological University, kaaugust@mtu.edu

Follow this and additional works at: https://digitalcommons.mtu.edu/michigantech-p

Part of the Physics Commons

Recommended Citation
Augustyn, K. (2019). Introduction to the second special issue on biological mentality. Journal of Cognitive Science, 20(2), 189-194. http://doi.org/10.17791/jcs.2019.20.2.189
Retrieved from: https://digitalcommons.mtu.edu/michigantech-p/1253

Follow this and additional works at: https://digitalcommons.mtu.edu/michigantech-p
Part of the Physics Commons
Introduction to the Second Special Issue
on Biological Mentality

Guest Editor
Kenneth A. Augustyn

Department of Physics
Michigan Technological University, Houghton Michigan, 49931 USA
kaaugust@mtu.edu

Abstract
The Second Workshop on Biological Mentality was held at the Michigan Tech Research Institute (www.mtri.org) conference facility in Ann Arbor, Michigan on September 24-26, 2018. Four papers by authors who gave workshop talks follow in this special issue of Journal of Cognitive Science.

Scientific Scope of the Meeting

The second Workshop on Biological mentality focused on interdisciplinary collaboration in understanding biological mentality and improving our concept of the physical foundation that underlies and enables mentality. The term biological mentality covers the nonconscious and conscious capabilities of living organisms. These capabilities require a physical foundation, one that perhaps transcends the computer metaphor and our current understanding of physics.
# Program

| Title                                                                 | Presenter                     | Institution                                                                 |
|----------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------|
| "Quantum Mechanics and Consciousness"                               | Marcus Appleby                | Centre for Engineered Quantum Systems, University of Sydney                 |
| "Computation and the Function of Consciousness"                     | Gualtiero Piccinini           | Philosophy Department, University of Missouri – St. Louis                   |
| "In Search of a Physical Foundation for Biological Mentality"       | Kenneth A. Augustyn           | Department of Physics, Michigan Technological University                    |
| "A Theory of Physically Embodied and Causally Effective Agency"     | Kathryn Blackmond Laskey      | Systems Engineering and Operations Research Department, George Mason University |
| "Physics and biological mentality"                                  | John M. Myers                 | School of Engineering and Applied Sciences, Harvard University              |
| "On the feasibility of coherent energy transfer in microtubules through tryptophans" | Xing Yin                      | Department of Chemistry, Princeton University                               |
| "Nuclear spin and biological mentality"                             | Stuart Hameroff               | Department of Anesthesiology, College of Medicine, University of Tucson     |
| "The ion channel nanomachine: A functional role for quantum dynamics in neural signaling with a possible relation to subjective states" | Gustav Bernroider             | University of Salzburg, Dept. of Ecology & Evolution                         |
"Cognitive modelling of first-person observers can explain quantum theory"
John Realpe-Gómez
Theoretical Physics Group, School of Physics and Astronomy, The University of Manchester

“Conscious Agents and Structure Invention”
Chetan Prakash
Professor Emeritus, Department of Mathematics, California State University San Bernardino

"Are living agents necessary to maintain a classical world?"
David Mumford
Division of Applied Mathematics, Brown University

"From Mental States to the Objective World: Methodological and Ontological Approaches"
Michael Cuffaro
Rotman Institute of Philosophy, University of Western Ontario

"From mental states to physics via algorithmic information theory"
Markus Mueller
Institute for Quantum Optics and Quantum Information Vienna, Austria

HARMONIC GESTALT: Sound from Structure: A Holistic Invariant Representation of Spatial Structure through Sound, as a model of Gestalt perception.
Steven Lehar
Independent Researcher

Papers in this Special Issue

**Physical Foundations of Biological Mentality**
by Kenneth A. Augustyn

Dualism struggles to connect two layers: the conscious mind and the physical workings of matter. It ignores a vast middle layer between the two, a layer that is beneath consciousness yet above known physical law. This
middle layer is trans-robotic mentality, a means discovered by Nature to transcend robotic mentality. This middle layer evolved over billions of years before consciousness emerged from it, assuming more and more functions critical to survival as species evolved. Consciousness eventually emerged from trans-robotic mentality (not from robotic mentality), first intermittently then later more-or-less continuously. But there is no direct link between consciousness and matter. Every moment of human consciousness is utterly dependent on processes that transcend the known physical processes of matter. Trans-robotic processes are in some sense physical because they are “powered by” converted mass-energy that disappears from the physical world (and can reappear in acts of free will). But in another sense they are not physical because they have genuine autonomy and externality from the known laws of physics. What we call mind is the simultaneous combined (and oft-times conflicted) operation of all three layers: robotic, trans-robotic, and conscious. Based on these conjectures, a new mind-matter theory is presented which predicts experimental violations in the principle of conservation of mass-energy in living organisms.

*Can Cognitive Science Help Us Understand Quantum Theory?*

by John Realpe-Gómez

Quantum-like phenomena can arise from two intuitive cognitive-inspired principles: (i) experiments are composed of two interacting physical subsystems, observer and apparatus; (ii) the composed system observer+apparatus is necessarily described from the perspective of one of its subsystems, the internal observer, not from the perspective of another observer external to the composed system.
Rhythms of Biological Symbol Handling

by John M. Myers and F. Hadi Madjid

From heart beats to the biochemistry of DNA, rhythms of symbol handling are essential to biology. To describe the rhythms of symbol handling, a new kind of physics is required. Acknowledging the agents that handle symbols leads to what could be called “two-clock physics” — or a “physics of the unexpected.”

Thoughts on Consciousness

by David Mumford

For many years, I have tried to come to a deeper understanding of what consciousness really means. This paper is a series of meditations about some aspects of this puzzle. First, I look at neuroscientists quest to localize consciousness in the brain and find wildly different conclusions. Second, believing that emotions are an essential component of consciousness, I explore some ideas of those who seek a theory of emotions. Third, I look at the connection of consciousness and time, especially the NOW. Fourthly, I try to lay out the pros and cons of which, if any, animals have consciousness. And finally, I discuss whether consciousness can find a home in silicon, in an “AI.”
