HSPI The Open Access Publisher

ABSE ANNALS OF BIOMEDICAL SCIENCE AND ENGINEERING
ISSN 2833-518X

Prospective

# Artificial awareness, as an innovative learning method and its application in science and technology

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**Submitted:** February 07, 2023
**Approved:** February 23, 2023
**Published:** February 24, 2023

**How to cite this article:** Adam A, Julia A. Artificial awareness, as an innovative learning method and its application in science and technology. Ann Biomed Sci Eng. 2023; 7: 012-019.

**DOI:** 10.29328/journal.abse.1001020



**Keywords:** Bioelectronic processes; Bioplasma; Biocomputer; Artificial awareness



## Abstract

The creation of the information society is associated with the creation of new intellectual, cultural, spiritual and material values, as well as with new principles and methods of social and interpersonal communication. Achieving this goal is impossible without changes in teaching methodology, teaching technologies and teacher's work.

The article is an overview and focuses on the following issues. In the information society, the era of biocomputers and quantum computers is coming, which will use not only artificial intelligence, but also artificial consciousness for simulation. Artificial awareness builds the foundations for the development of robots that will be widely used in various fields of industry and science.

- Artificial awareness combined with artificial intelligence can be an innovative method in education and communication;

- Quantum computers and biocomputers will find wide application in human education and social life;

## The concept of artificial intelligence and artificial awareness

There are many definitions of artificial intelligence, but there is no uniform one for all departments of IT. Let's get acquainted with a few of them:

a) It is a branch of computer science that studies how people think and act. He tries to imitate the model of these behaviors in computer programs. This allows them to behave intelligently, similar to humans.

b) It is the study of machines that perform tasks that only an intelligent human being can do. An example would be facial recognition, which is easy for humans but difficult for machines.

c) It is a machine that can answer a question just as wisely as a human being. It can be described so vividly that artificial intelligence is the imitation by machines, especially computer systems, of the processes that determine human intelligence.

Artificial Intelligence is the study of how to produce machines equipped with certain qualities of the human mind, such as the ability to understand language, recognize images, solve problems and learn. Artificial Intelligence is related to the areas of machine learning, fuzzy logic, computer vision, neural networks, mathematical computing, and robotics [1].

**Machine learning:** Is a branch of artificial intelligence in which programs automatically modify their knowledge and procedures to improve performance. The programs here are based on clear instructions from the teacher. Machine learning allows computers to cope with new situations through analysis, self-education, observation and learning. Before the job is done, the machine receives many trial examples. She learns from them, adapting her strategy of action in such a way as to achieve the goal set for her by man. The machine is confronted with new scenarios. Computers learn with this method, for example, to recognize objects [2,3].

Machine learning facilitates the constant development of IT as machines face ever different scenarios, have to test and adapt to new situations. At the same time, in order for their subsequent decisions to be better than the previous ones, they must detect patterns and trends. In all these processes, artificial consciousness will improve machine learning [4,5].

A robot can be another tool supporting the everyday life of a human being. Although it is inanimate matter, it can fulfill various functions: act as a companion, facilitate the management of time, e.g. through audiobooks, music, games, enable contact with relatives and friends, remind about important activities, such as taking medications, replenishing fluids, walking, and reminding about appointments visits and other important events. Equipping the robot with simple exercise patterns that are safe for seniors may help to increase their physical activity and maintain or improve their mobility and physical fitness. This type of robot may prove particularly useful for lonely elderly people, with autism, or for long-term home alone, for people with functional deficits such as disabilities, or with cognitive impairment with a mild degree of deficit. Interacting with a robot, using its resources such as audiobooks, games, etc., can contribute to the development of cognitive functions and mood. A robot with artificial awareness would be more communicative, let's see this problem from the perspective of quantum psychology [6-9].

According to Z. Zaborowski, "awareness is a process of coding, processing, information about oneself and its integration with the world around him. The psychological basis of the coding process is attention, information processing is related to memory and thinking, and information integration is related to consciousness" [10]. This researcher distinguishes individual, external, defensive and reflective self-awareness. Reflective self-awareness involves integrating information about yourself at a higher level based on concepts, schemas and abstract thinking. It is the highest stage of human mental development, it has a factor that unifies mental phenomena: memory, attention, thinking, imagination and emotional experiences that have developed in humans in the course of evolution [10].

Consciousness works with the brain, but the brain can function in a different waking state; sleep, anesthesia, meditation, drug addiction, and illness all cause a loss of consciousness, called altered states of consciousness. In an altered state of consciousness there is a distortion of perceptions, for example visual, a distortion of the perception of time and space, a sense of separation from the body from one's own "self", one's own needs and life problems. There may also be a sense of certainty, enlightenment, joy, ecstasy and a sense of union with other people and the world. Being aware means having access to information about the course of one's own mental processes, the possibility of processing this information and using it in the process of mental regulation [11].

There are also opinions about the superior, regulatory function of consciousness, that consciousness determines the goals and programs to which the operation of executive mechanisms is subordinated and controls the implementation of these programs. Consciousness is responsible for planning, organizing, coordinating and executive regulation of unconscious cognitive activity [12].

In Chmielecki's view, awareness of perception is something that takes place in the mind or soul, but also in the outside world. Consciousness is not the power to establish representations, meanings or meanings, it only makes them manifest. "Consciousness is not cognitive, it is aimed at nothing, it does not refer to anything, but it deals with the disclosure of phenomena in the qualitative and quantitative terms. It is not a separate act, but a result" [13].

In Bohm's understanding, consciousness is a global phenomenon, it occurs in the brain, but also in the whole organism and the cosmos. So the cosmos consists of material life and consciousness, factors which determine the activities of every being on Earth [14].

The author understands consciousness as a dynamic structure of quantum-cybernetic-informational processes taking place in the bioplasm of the brain, which is in synergistic interaction with biocomputer simulation, guided by the emission of coherent light, modulated by soliton and spin waves [15].

The relationship of physical, biochemical, informational and cybernetic processes in living organisms is in fact the relationship of structure and function, the structure being determined by biochemical and physical processes, again function, determined by information, bioelectronic and cybernetic processes. Information processes cannot be reduced to purely biochemical and physical processes, because information systems react to information and are guided by the laws of binary or quantum computing. Bioplasm plays a special role in consciousness. The stimulus received by the senses must be identified and compared with the resources of individual bioplasm for a given organism, which includes specific patterns of perceiving the world, style of thinking and behavior characteristic for a given personality. The received stimulus is processed by bioplasm programs in protein, DNA and melanin biocomputers [16].

The assessed perceptual image by bioplasm gives the impression of the structure of a given stimulus, its place in space-time, an emotional evaluation related to the subjective impression, which is often different in different people, even though one sees the same object or situation. In bioplasm, a perceptual and mental image is created - states of thought, emotion, decision, memory, etc. Consciousness deals with the disclosure of perceptual-psychological phenomena for the mind in qualitative and quantitative terms, which gives a person allopsychic orientation - this is the awareness of place, time, space and situation self, and autopsychic orientation - this is awareness of oneself, own mental states, etc. [17].

A disturbance of consciousness is a state in which our mind becomes unconscious. We suddenly lose our orientation in the world. Our self-control drops significantly. Focusing attention can be very difficult. The person perceives reality in fragments. Light bioplasma has a specific wave structure,

which is the carrier of information and its processing in various forms, it has a significant role for organisms. The biplasm of light is composed of solitons, photons, magnons and gravitons. It takes an active part in morphogenetic processes, in the integration of biosystems and the exchange of information between the biosphere and the cosmosphere. All life on Earth exists only because of this bioplasm, because it is rational, active, permeates and organizes all reality. It is a state in which laws describing the behavior of waves and fields, individual interactions and integrating interactions are simultaneously expressed. Life and bioplasma condition each other. Life takes place thanks to the bioplasm of light, and life processes create it. It has not only intelligence, but also freedom of will and cultural patterns. It is a source of love that somatic bioplasm does not have. Light bioplasma resembles the morphogenetic field, controls genetic codes, i.e. chemical matrices. The bioplasm of light is related to collective memory, which has its place in the somatic bioplasm, but also patterns of transpersonal behavior, linguistic structure, content of myths, cultural and philosophical currents that occur on different continents of the world with the same content, and the entire global communication system. Solitons as carriers of concepts, contents and symbols allow us to see the world not only through the perceptual but also beyond the sensual

- Through metaphorical awareness and structure Jungian archetypes [18].

The author attributes the following features of consciousness:

- Consciousness is shaped according to the pattern of bioplasm and assigned to a specific one personality;
- Consciousness and mind reflect the action of bioplasm;
- Consciousness is related to the causal and non-causal laws of nature;
- Consciousness is eternal and has mythical features;
- Consciousness has human properties and its nature is situated in a quantum cybernetic- information processes;
- Consciousness has a systemic structure and is managed by the laws of cybernetics;
- Consciousness demonstrates the ability to reveal phenomena in a holistic system and coherent;
- Consciousness does not create mental and psychic acts, bioplasm does it, it only eats discloses to the subject;

Consciousness has the ability to transcend - that is, connect with the cosmos and this to go beyond the perceptual-psychological processes and the environment in which he lives man;

- Consciousness mediates between what is internal (what is in the subject) and this what's external. Mediation is the disclosure of a given phenomenon, impression, experiencing e.g. pain, suffering, depression, ecstasy, wakefulness, etc. - awareness can work at different organizational levels - perceptual, pre-reflective, complex, reflective etc;
- Consciousness uses quantum local and non-local processes. It gives her it the possibility of going beyond the human body; [19].

There are empirical premises for creating artificial consciousness;

1 Creation of an integrated circuit in the field of bioplasm parameters. This problem is not it should be more difficult, because every living organism is the disposer bioplasmas. Good knowledge of the functioning of biocomputers and quantum computers, will allow us to use the resources of artificial awareness.

2 Building a physical medium in which the action of coherent light will take place on solitons in the area of bioplasm;

3 Development of high-capacity computer simulation algorithms, along with imaging information on a spin and soliton wave medium, Computer simulation it should interact with the bioplasmic center.

4 The laws and mechanisms governing the development and organization of consciousness are contained in the bioplasm.

5 Absorption of solitons from space, processing and processing them in bioplasm, or in a Bose-Einstein condensate. Science should not have a problem with that, as it is known there is already Bose-Einstein condensate, there are known solitons. You just have to create devices to read their content and information signs [20,21].

## Information society in computer education

Technical progress, including the development of information technology, creates great educational opportunities, builds an Internet network that enables remote teaching and individual study, based on countless sources. New teaching techniques and technologies refer to the use of electronic technology in teaching to a greater extent than in the traditional computer training or computer-assisted learning from the mid-1980. When using mobile technologies, the term M-learning is used. Mobile learning refers to the use of portable, wireless equipment such as laptops, PDAs, as well as modern mobile phones, the so-called smartphones. All these devices, in order to meet the requirements of m-learning, should have constant wireless access to the Internet in every possible place [8].

The Internet is a great help with homework and school assignments. It's also a great way to meet people from other parts of the world, from different cultures. This is the cheapest ticket for a trip around the world. However, it should be remembered that it carries many threats in the cultural, moral, social and especially health system. The electromagnetic field emitted from the monitor blocks the synthesis of melatonin, which results in a disturbance in visual perception, lowering the relaxation threshold, and hyperactivity combined with attention deficit [22,23].

Professor Józef Bańka from the University of Silesia believes that virtual reality has nothing to do with our past or future. It only applies to the present situation, the moment when something is happening. This researcher claims that the excess of information, the inability to select information, a large amount of distorted information, manipulation of information, and the inability to verify it in terms of truthfulness, all this leads to the loss of a person in a given reality. It produces new forms of social differentiation, new social structures, changes in people's communication and thus changes in the functioning of social bonds. In this digital community, a new type of community is created, the so-called virtual community, in which there is a total determination of social, economic, partly also political and cultural life through the mass media and the operation of computers or microprocessors [24,25].

The author is looking for a solution to this problem in biocomputers that will be governed by biological laws and are definitely less harmful to humans. This is supported by the fact that the human biological system meets all the parameters of an electronic device and is built on better electronic components than an ordinary computer, and has better algorithms than binary computing. Cosmic consciousness and bioplasma are involved in developing the algorithms [26].

The binary system does not solve all computer science problems, algorithms for quantum computers are being searched for. Quantum computers are in the early stages of development and it will be a long time before they will find application in everyday life. The same is the case with Biocomputers. Quantum informatics is a new field of computer science that is developing dynamically, especially at the theoretical level. Also on the technological level - very interesting discoveries are made, but it is too early to produce serial quantum computers.

Quantum algorithms and communication protocols based on the laws of quantum physics developed so far. They showed the possibilities that lie in the quantum model of information processing. The discovery of quantum algorithms has a great impact on the development of computer science [27,28].

The rapid development of computer science and rototics will lead to the fact that artificial consciousness, will cooperate with artificial intelligence, they will find application in the creation of robots, including the control of their movement. Robots believe that the artificial consciousness will be guided by humans through thoughts or words. He will be able to keep you informed about the difficulties and possibilities of performing the task. Such feedback will allow you to perform very precise activities in various branches of technology and science. Such a robot will also be able to cooperate with a human being within the interface in simple life situations, such as settling office matters, it will teach how to talk to the employer during employment, it will show that the opinion about advertising it contains a manipulative factor, rejects a variety of thinking, leads to discrimination, etc. [29].

Modern ICT technologies are changing the world around us at a dizzying pace. The changes concern all areas of our life: work, science, social relations and in particular education. Living on the threshold of the information society, we are constantly faced with a flood of information that needs to be filtered and extracted from what is most valuable. This is because knowledge in the 21st century is a "strategic wealth" and skills determine the competitive advantage on the labor market. Education in the 21st century is faced with a huge challenge, it is necessary to educate a person with high social competences, who can search and process information, solve problems bothering life and use modern technologies. In order for this task to be properly completed, there is a need for highly qualified teaching staff who will efficiently use modern teaching resources [30].

## Bioelectronic construction of homo electronicus

The human biological system creates a pictorial structure of the world not only through the electromagnetic and acoustic waves perceived by the senses, but also on the basis of soliton, spin and bioplasm waves. These new information carriers should be used by science, especially computer science, to build new educational programs [31].

In bioelectronic terms, "the organism is understood as an integrated circuit of biological piezoelectrics, pyroelectrics, ferromagnets and semiconductors, filled with bioplasm and managed electronically by quantum processes" [32].

The presence of semiconductors in a biological system is synonymous with the presence of an electronic integrated device, therefore a living organism can be seen as a complex electronic device, analogous to technical devices. In a biological system, information is paramount to mass and energy. It affects all psychobiological processes and is responsible for their structure, function and their entire development. "In bioelectronics terms, the biological system has several information channels, such as: electron, proton, soliton, electromagnetic, acoustic, spin field and bioplasm channels through which life constantly identifies and continues [33].

Proteins, DNA, RNA, melanin are biological structures, from the biochemical point of view, they are chemical compounds with different chemical formulas, again from the

bioelectronics side it is an electronic material that can be used as a structural element in a bioelectronic device which is an organism. In technical devices, these materials were used to construct enzyme transistors [34,35].

Enzymes are assigned the role of not only biochemical biocatalysts, but are also believed to play the role of transistors and nanoprocessors [36-38].

Molecular computing based on enzymes or nucleic acids has attracted a great deal of attention due to the perspectives of controlling living systems in the way we control electronic computers. Enzyme-based computational systems can respond to a great variety of small molecule inputs. They have the advantage of signal amplification and highly specific recognition. DNA computing systems are most often controlled by oligonucleotide inputs/outputs and are capable of sophisticated computing as well as controlling gene expressions [39,40].

Biomolecular computers may have a number of practical uses in the future, owing to their various properties, such as parallelism of operation or the ability to store information. Importantly, the biomolecular computers may, in the predictable future, fill some gaps in the areas not yet accessible to conventional computers. Particularly interesting is the compatibility between biomolecular computers and the cellular environment via biochemical reactions taking place both *in vitro* and *in vivo*. An important part of DNA computing is involved in the construction of intelligent biochips (meaning decision making in the choice of a diagnosis/treatment direction), as such technological solutions may simplify and automate molecular diagnostics [41].

## Soliton and spin action in mental processes

Solitons are formed in nonlinear optical centers and in Bose-Einstein concentrates. Strong laser waves, degree of nonlinearity and high concentration of atoms in Bose-Einstein condensates have an influence on the formation of multidimensional solitons. Currently, the greatest degree of non-linearity is achieved by organic substances, in which the electrons appear to travel long distances [42].

A soliton is defined as a moving, solitary, high-power impulse that does not deform when in contact with another particle, wave, or field. There are light, water and sound solitons that can interact strongly with other solitons [43,44].

The movement of solitons is influenced by the density and thickness of the biological membrane in the cell, as it determines the size of the piezoelectric effect from which the electric field flows, interacting with the solitons. The brain has the ability to generate and receive soliton fields that take an active part in the processes of human life and determine his personality development. Soliton signals are transmitted to the mental and spiritual realms - these are mental, emotional and conscious states. Solitons can spread throughout the universe and they don't disappear. They exist from the beginning of life until now. The cosmos is densely filled with a soliton network, carrying content and meaning that have an impact on human life [31,45].

The action of solitons in the human biological system provides the basis for seeing the human psyche in a different light than current psychology. The spin and soliton waves create a different image than the electromagnetic waves picked up by the eye receptor. The science to date recognizes only the action of electromagnetic waves on the sense of sight. It can be concluded that we are dealing with a second center that creates the structure of the world image and is responsible for the development of the human personality. In current biology and psychology, there is no room for the solitons and spin functions that quantum physics deals with. According to the author, consciousness cooperates with the cosmos and follows the laws of quantum mechanics [19].

According to its law, consciousness may be in a specific area of space, it may not be there, or its location is indefinite. "The concept of eternal awareness means that our brain probably acts as a receiver and transmitter and not as a producer of our consciousness. This non-local awareness exists outside of time and space. Eternal awareness means that our consciousness knows no beginning or end, that there is a continuation of consciousness and that consciousness is independent of our physical body". eternal consciousness is related to everything and everyone [46].

Hameroff believes that synapses and neurons have a complex structure and should be treated as biocomputers (nanoprocessors). They are distinguished by high ability to process information in parallel in microfibers, microtubules and in the entire cytoskeleton, which is capable of collective processing of information in the area of a biological cell at the molecular level and acts as a computer cluster. To understand the operation of the cytoskeleton, many cluster models were constructed, but they did not produce the expected results. Research shows that artificial neural networks cannot accurately reproduce the characteristics of the brain. Namely, they are not able to precisely define a dynamically changing hierarchy of information with which the brain has no problem [47-50].

Quantum consciousness requires the generation of the emission of coherent light cooperating with the solitons in the bioplasm and in the Bose-Einstein condensate [20].

It needs to absorb solitons from space, and to process ihn. Building artificial awareness will open the way to new knowledge and new educational systems, richer than artificial intelligence. In this area, there are already very interesting works on the application of artificial consciousness in robots carried out by Haikonen, Pentti [51,52-61].

In conclusion, it should be noted that artificial intelligence

is an important element of almost all sectors of the modern economy, technology and science, which has a significant impact on our private, social, professional and political life. It finds a place in culture, education, social interaction, understanding new socio-natural phenomena (ecosystem protection), learning to translate texts and speech, recognizing the content of images, and other tasks that require high intelligence. A similar matter is with artificial consciousness, which builds the basis for the development of the functioning of robots, based on new information carriers, such as the soliton wave. and spin. Quantum physics shows us the possibilities that lie in the quantum model of information processing, as well as in artificial consciousness. Combining artificial consciousness with artificial intelligence, using machine learning in the construction of robots that can interact socially with people. The robot can be another tool supporting the senior in everyday life. Although it is inanimate matter, it can fulfill various functions: the role of a companion, facilitate the management of time, e.g. through audiobooks, music, games, enable contact with relatives and friends, remind about important activities, such as taking medications, replenishing fluids, walking, remind about appointments and other important events, related to health and the recognition of disease patterns, which may lead to new discoveries in medicine and the improvement of individual diagnostics. It should be stated that each organism must have its own specific mechanism to distinguish and selecting the information that it needs for its functioning with the robot ... In this he will be helped by artificial awareness and artificial intelligence.

## Summary

There are empirical premises for creating artificial consciousness with the possibility of using it in technology and science. From the biological point of view, man is an open system and cannot be considered in isolation from his surroundings, because he and his surroundings constitute a whole. There is a constant exchange of information, energy and matter between man and his environment. The whole world is one, all the processes taking place in it are interconnected and interact with each other, focusing in themselves all the forces and influences coming from the cosmos that are so strong that they cannot be ignored.

Consciousness can follow the laws of quantum mechanics, which allows it to be in a certain area of space, or it may not be there, or its location is indefinite. This means that consciousness is self-organizing, without time and without a spatial dimension, it is situated throughout the Cosmos. This nonlocal awareness should be a challenge for science in the coming years.

Good knowledge of bioplasm and the laws of consciousness, as well as broader research on Bose-Einstein condensate in biological systems will allow us to understand the existence of solitons in living organisms, their significant role in education and in adaptation to the environment. These studies discover the other side of the psyche, which will allow a better understanding of the learning process and building programs education with the use of various information technologies and biotechnologies [20].

The brain, as a biological computer, unlike a technological mathematical machine, does not need derivative software externally because it has its own software embedded in the cell, therefore in the field of biology structure cannot be separated from function [48].

## Conclusion

1. Modern science has real possibilities to build an artificial consciousness that will cooperate with cosmic consciousness as an interface. It will show new methods of education, as well as its application in technology, medicine, military and in everyday life.

2. It should be recognized that mental processes are conditioned not only by electromagnetic and acoustic waves, but also by soliton, spin and bioplasm waves. The current education deals only with the acoustic and electromagnetic waves and not the soliton and spin waves. Psychology and pedagogy, should arouse greater interest in the latter part of the psyche.

3. The nature of mental processes is situated in the biocomputer simulation. The task of biocomputers is to process and organize perceptual images and transfer them to the bioplasm. High knowledge of algorithms developed by research centers, combined with the work of biocomputers, will improve new learning techniques.

4. Psychology must recognize that the individual phenomenon of life is an event of th organism-environment-cosmosphere systemic connection.

5. Information technologies should look for a link to morphogenetic fields in their educational methods.

6. Soliton and spin waves are the basic structure of mental processes and educational programs should be built on these information carriers.

This paper may be useful for students of psychology, psychologists with interests in the field of quantum psychology, bioelectronics interested in artificial consciousness and intelligence, as it shows the knowledge that can be used in integrated circuits, in the production of robots, for the military. For scientists in the field of cognitive science, for whom new light is shed on human mental states, but also for quantum physicists, in order to conduct further experimental research on light bioplasm, solitons, spin wave and artificial consciousness related to synchronous phenomena.

## References


1. Rutkowski L. Metody i techniki sztucznej inteligencji. [Methods and techniques of artificial intelligence]. Poznań. 2005
2. Aslay C. Maximising the diversity of exposure in a social network, IEEE International Conference on Data Mining. 2018; 863-868.
3. Khramov D. Robotic and machine learning: how to help support to process customer tickets more effectively. Bachelor's thesis. Helsinki, Finland: Metropolia University of Applied Sciences. 2018.
4. Russel S, Norvig P. Artificial Intelligence: A Modern Approach, 2nd edition, Prentice Hall. 2003.
5. Sîrbu A, Pedreschi D, Giannotti F, Kertész J. Algorithmic bias amplifies opinion fragmentation and polarization: A bounded confidence model. PLoS One. 2019 Mar 5;14(3):e0213246. doi: 10.1371/journal.pone.0213246. PMID: 30835742; PMCID: PMC6400382.
6. Ghazal B, Khaleb K. Smart Home Automation System for Elderly, and Handicapped People Using XBee. International Journal of Smart Home. 2015; 9(4): 203-210.
7. Halicka K, Ejdys J. Humanoid robots in the care of the elderly. International society for manufacturing, service and management engineering. Białystok. 2018.
8. Ivanov S. Robonomics-principles, benefits, challenges, solutions. Yearbook of Varna University of Management. 2017; 10:283-293.
9. Anagoste S. Robotic Automation Process - The next major revolution in terms of back office operations improvement. Proceedings of the 11th International Conference on Business Excellence. 2017; 676-686. doi: 10.1515/picbe-2017-0072.
10. Zaborowski Z. Human consciousness and self-awareness. ed. Psychology and Culture. Warsaw: Eneteia.1998.
11. Wojciszke B. Evolution of contemporary social psychology [Evolution of modern social psychology II. Thematic consequences for the problem of consciousness. Psychological Review. 1980; 23:.281-308.
12. Thargard P. Pararllel computation and the mind-body problem. Cognitives Science. 1986;10:301-318.
13. Chmielecki A. Between the brain and consciousness. ed. Institute of Philosophy and Sociology, Polish Academy of Sciences, Warsaw. 2001.
14. Bohm D. Wholeness and the Implicate Order. London, Boston: Routledge & Kegan Paul. 1980.
15. Adamski A.The importance of movement, solitons and coherent light in the Development of mental processes. Journal of Advanced Neuroscience Research. 2016; 3:24-31.
16. Adamski A. Biocomputers information management in the human biological system. Rocznik Bio-Algorithms and Med.- System. 2011; 7:4,59-65.
17. Adamski A. Life is in quantum processes . Advances in Tissue Engineering & Regenerative Medicine: Open Access - January 23, 2020.
18. Adamski A. Quantum nature of consciousness and the unconscious collective of Carl G. Jung. NeuroQuantology V.11.ISSUE. 2013; 3:466-476.
19. Adamski A. Bioplasma as a link between cosmic consciousness and consciousness man and its influence on the creation of artificial consciousness. In:Earth, Space in the Perspective of Security, Challenges, Opportunities and Threats Editors: Marian Cieślarczyk, Maryl Fałdowska, Agnieszka Filipek. Siedlce. 2017.
20. Adamski A. Role of Bose-Einstein condensate and bioplasma in shaping Consciousness NeuroQuantology. 2016; 14:1; 896-907.
21. Adamski A. Creating artificial awareness and its dimension in social life. Journal of Biology and Medicine: Open Access. 2020;1(1):10; 104.
22. Juszczyk S. Man in the light of electronic media - opportunities and threats].Katowice: ed. University of Silesia. 2000.
23. Pasquale F. The black box socjety. Harvard University Press. 2015.
24. Bańka J. Virtual metaphysics. Treatise on temporary structures. Katowice: Ed. 16. University of Silesia in Katowice. 2001.
25. Garimella K. Reducing controversy by connecting opposing views. Proceedings of the Tenth ACM International Conference on Web Search and Data Mining. 2017; 81-90.
26. Adamski A. In search of the nature of consciousness in quantum processes]. Katowice: Publishing House University of Silesia in Katowice. 2016.
27. Shor P. Algorithms for Quantum Computation: Discrete Logarithm and Factoring Proc. 35th. Annual Symposium on Foundations of Computer Science (IEEE, Los Alamitos, CA, 1994; 124.
28. Hirvensalo M. Quantum algorithms. [Quantum algorithms]. School and Pedagogical Publishers. Warsaw. 2004.
29. Sobczak A. Robotization of business processes - current state and development prospects. Organization Overview, 2018;10: 52-61. doi: 10.33141/po.2018.10.07.
30. Smyrnova–Trybulska E. (Ed.). Effective Development of Teachers' Skills in the Area of ICT and E-learning. Seria on E-learning. 2017; 9. Katowice–Cieszyn: Studio Noa for University of Silesia. 2017; 497. ISSN: 2451-3644 (print edition) ISSN 2451-3652 (digital edition) ISBN 978-83-60071-96-0.
31. Adamski A. Soliton perception in the human biological system Advances in Tissue Engineering & Regenerative Medicine. February 27, 2020; 6:1; 18-32.
32. Sedlak W. Bioelectronics 1967-1977. Warszawa. IW PAX. 1979.
33. Sedlak W. Bioelectronics - bioplasma - anthropology of the future. Science notebooks. KUL. 1976; 19:1; 3-10.
34. Cárdenas ML. Are the transitory enzyme-enzyme complexes found in vitro also transitory in vivo? If so, are they physiologically important? J Theor Biol. 1991 Sep 7;152(1):111-3. doi: 10.1016/s0022-5193(05)80522-3. PMID: 1753753.
35. Błasiak J, Krasiński T, Popławski T, Sakowski S. Komputery DNA [DNA computing]. Postepy Biochem. 2011;57(1):13-23. Polish. PMID: 21735816.
36. Wnuk M. Enzymes as nanoprocessors - bioelectronics perspective] „ Annals of Philosophy" no. 1995; 43: 3; 127.
37. Mailloux S, Evgeny Katz E. Biocomputing, biosensing and bioactuation based on enzyme biocatalyzed reactions. 13699-5810, USA. 2014.
38. Katz E. Bioelectronic Interface Between Enzyme-Based and DNA-Based Computing Systems. In book: Enzyme-Based Computing Systems. 2021; 335-355. DOI:10.1002/9783527819997.ch14.
29. Mailloux S, Gerasimova YV, Guz N, Kolpashchikov DM, Katz E. Bridging the Two Worlds: A Universal Interface between Enzymatic and DNA Computing Systems. Angew Chem Int Ed Engl. 2015 May 26;54(22):6562-6. doi: 10.1002/anie.201411148. Epub 2015 Apr 9. PMID: 25864379; PMCID: PMC4495919.
40. Sakowski S, Krasiński T, Waldmajer J, Sarnik J, Blasiak J, Poplawski T. Biomolecular computers with multiple restriction enzymes. Genet. Mol. Biol. 2017; 40: 860-870.
41. Sakowski S, Waldmajer J, Majsterek I, Popławski T. DNA Computing: Concepts for Medical Applications . Appl. Sci. 2022; 12(14): 6928. https://doi.org/10.3390/app12146928
42. Brizhik L. Influence of electromagnetic field on soliton-mediated charge transport in biological systems. Electromagn Biol Med. 2015;34(2):123-32. doi: 10.3109/15368378.2015.1036071. PMID: 26098523.
43. Brizhik L. Solitons mechanism of weak photon emission from biological systems. Nanoscience and Nanotechnology. 2013; 3:120050570.

44. Brizhik L. Effects of magnetic fields on soliton mediated charge transport in biological systems. J. Adv. Phys. 2014; 6: 1191-1201.

45. Trąbka J. Light neuropsychology ed. Jagiellonian university. 2003.

46. Jacyna-Onyszkiewicz Z. Quantum cosmogenesis. Poznan: Ed. Adam Mickiewicz University in Poznań. 2008.

47. Hagan S, Hameroff SR, Tuszyński JA. Quantum computation in brain microtubules: decoherence and biological feasibility. Phys Rev E Stat Nonlin Soft Matter Phys. 2002 Jun;65(6 Pt 1):061901. doi: 10.1103/PhysRevE.65.061901. Epub 2002 Jun 10. PMID: 12188753.

48. Hameroff SR. The brain is both neurocomputer and quantum computer. Cogn Sci. 2007 Nov 12;31(6):1035-45. doi: 10.1080/03640-210701704004. PMID: 21635328.

49. Benenson Y. Biocomputers: from test tubes to live cells. Mol Biosyst. 2009 Jul;5(7):675-85. doi: 10.1039/b902484k. Epub 2009 Apr 15. PMID: 19562106; PMCID: PMC2714485.

50. Benenson Y. Biomolecular computing systems: principles, progress and potential. Nat Rev Genet. 2012 Jun 12;13(7):455-68. doi: 10.1038/nrg3197. PMID: 22688678.

51. Haikonen P. Consciousness and Robot Sentience, Singapore: World Scientific. 2012.

52. Reggia JA. The rise of machine consciousness: studying consciousness with computational models. Neural Netw. 2013 Aug;44:112-31. doi: 10.1016/j.neunet.2013.03.011. Epub 2013 Mar 26. PMID: 23597599.

53. Adamski, A. Biological system as an electronic system and its importance in processes. Conference. Simultaneously integrating approaches to the concept of man. In days 19-20. Ex. Palacke University in Olomouc. 2007; 216- 220.

54. Adleman LM. Molecular computation of solutions to combinatorial problems. Science. 1994 Nov 11;266(5187):1021-4. doi: 10.1126/science.7973651. PMID: 7973651.

55. Furmanek W. Modern technologies in teaching and education. ed. University of Rzeszów, Rzeszów. 2000.

56. Hennink M, Hutter I, Bailey A. Qualitative Research Methods, SAGE, Los Angeles. 2011.

57. Moe-Behrens GH. The biological microprocessor, or how to build a computer with biological parts. Comput Struct Biotechnol J. 2013 Jun 26;7:e201304003. doi: 10.5936/csbj.201304003. PMID: 24688733; PMCID: PMC3962179.

58. Laszlo E. Systemic view of the world. Wyd. PIW. Warszawa. 1978.

59. Shimomura M. Electronic communications between molecular associates and enzymes. Kagaku Kyoto, 1991; 46:8; 571-576.

60. Simonite T. DNA computer is unbeatable at tic-tac-toe, New Scientist. 2006; 17.X.

61. Sedlak W. Homo electronicus. Warszawa. PIW. 1980.