ADVANCING THE THEORY, PHILOSOPHY AND PRACTICE OF INFORMATION STUDIES IN THE ERA OF INFO-COMPUTATION, COGNITION AND INTELLIGENCE

Gordana Dodig-Crnkovic

Abstract: *Contemporary societies face increasing knowledge fragmentation driven by rapid technological change and the conceptual dispersion of the information field. This article examines how the theory, philosophy and practice of information studies have been advancing in the era of info-computation, cognition and intelligence. It traces the historical development of the International Society for Information Studies (IS4SI) and its affiliated communities, showing how successive scholarly initiatives have strengthened conceptual integration across diverse approaches to information. The paper highlights theoretical contributions that reveal the deep connections between information processes and computation, and analyses how these developments have shaped current understandings of cognition and intelligence in natural and artificial systems. It also discusses how practical applications emerging from IS4SI activities reflect these conceptual advances. Finally, the establishment of the International Academy of Information Studies (IAIS) is presented as a significant institutional step that consolidates this progress and supports ongoing informational consilience across disciplines.*

Keywords: *Information theory; Computation; Cognition; Info-computationalism; Philosophy of information.*

ITHEA Keywords: *Systems and Information Theory; Philosophy of Computing; Information Science; Information theory and its application; Computers and Society.*

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Introduction. The Evolution of the Society for Information Studies (IS4SI) as a Nexus of Communities in Information Studies

The International Society for Information Studies (IS4SI) is an umbrella organisation of scientists, other scholars, research institutions, practitioners and society at large worldwide dedicated to transdisciplinary global study of information for the good of humanity, through the dialog between disciplines and respect for the complementary views on its complex problems.

Each biannual meeting of the IS4SI addresses a specific topic to orient focus of communities networked under the umbrella of the society towards a common theme, discussing and exchanging thoughts across disciplinary borders.

Origins and Foundation of IS4SI

In August 2010, the Fourth International Conference on the Information Science took place in Beijing. It was organized by the Social Information Science Institute (SISI) at the Huazhong University of Science and Technology (HUST) in Wuhan and sponsored by the Chinese Association for Artificial Intelligence (CAAI). It was held under the motto "Towards a New Science of Information". At the conference a committee was established to prepare the founding of an International Society for Information Studies that shall advance global and collaborative studies in the sciences of information, information technology and information society as a field in its own right, elaborate common conceptual frameworks and implement them in practice so as to contribute to mastering the challenges of the information age, and hold conferences in the field every two years. On June 24th, 2011, the International Society for Information Studies was registered in Vienna as association.

Historical Background and Independent Communities

However, history of alliances between different communities and individual scholars within information studies is much older than that. Foundations of Information Science, co-founded by Pedro Marijuan and Michael Conrad, is one of the core communities of IS4SI. It held its first conference in Madrid, Spain, as early as July 11-15, 1994, thus more than 30 years ago. This community is still

going strong, presenting one of the characteristic constants that in different constellations re-appear year after year.

Further expansion of a unified study and development of information was presented during the first and second international conferences of the FIS (Foundations of Information Science), which took place in Madrid in 1994, and Vienna in 1996. Wolfgang Hofkirchner summarized and expanded those concepts in his edited volume "The Quest for a Unified Theory of Information" (1999).

As an illustration, here is the list of topics of the Conference FIS2005, Seeking a unifying field for science information: Information in Physics and Chemistry. Data Banks and Data Mining, Neural Information, Bioinformation and Bioinformatics, Biosemiotics, Information and the Codes of Life, Genomics, Biomedical Applications, Ecology, Global Mathematical Aspects of Information: Information Theory and Its Applications, Networks, Symmetry, Agency, Semiotics, Trends in Information and Communication Sciences, Open Access and the Information Society. Economic, Social and Philosophical Aspects.

Science of information institute SOII was part of the development of the community.

Among the central communities is BITrum, engaged with the project of a Glossary. The interdisciplinary research group was constituted on November 7th, 2008, on the occasion of the First International Meeting of Experts in Information Theory held in León, Spain. BITrum remains one of the most active communities under the IS4SI umbrella today. Its glossaLAB project continues this trajectory toward collaborative knowledge integration, [Hofkirchner et al., 2019] [Díaz-Nafría et al., 2019] [Díaz-Nafría et al., 2018].

Table 1. History of Information Science and the Emergence of IS4SI

Period / Year	Key Events and Developments	Relevance to IS4SI Formation
1960s–1970s	Emergence of information science as a field; institutionalization in universities (Araújo, 2021).	Establishes diversity of perspectives; early need for conceptual integration.

1970s–1990s	Rapid growth and specialization into subdisciplines	Growing fragmentation encourages systemic dialogue.
1994	First Foundations of Information Science Conference (FIS), Madrid	"From computers and quantum physics to cells, nervous systems, and societies"
1996	FIS 2 (Vienna, Austria)	"The Quest for a Unified Theory of Information"
1998	FIS 1998 e-Conference	*Information & Physics* – Koichiro Matsuno, *Biological Information* – Ray Paton, *The Language of Cells* – Pedro C. Marijuan & José Pastor, *Social Information* – Bob Artigiani [Marijuan, 1998] [Marijuán, 1998-CHK]
2002	FIS 2002 e-Conference	"The Nature of Information: Conceptions, Misconceptions and Paradoxes" May 6–10 2002. [Marijuan, 2003]
2005	FIS 3 (Paris, France)	"Seeking a unifying field for science of information" [FIS, 2005]
–2008	Continuing FIS conferences; SOII, BITrum and others	Builds networks later incorporated into IS4SI.
Late 2000s	Search for conceptual frameworks (Araújo, 2021).	Creates conditions for an umbrella organization.
2010–	Beijing, China	"On the Foundations of Information Science"; [del Moral & Marijuán, 2012] [del Moral, Navarro & Marijuán, 2014]

IS4SI Summits and Development

The stage for the Gothenburg summit in 2017 was set by the theme of Digitalization for sustainable society, in light of information, computation and cognition. As previous IS4SI meetings, the summit in Gothenburg reflected the moment in time – a nascent movement of digitalization that has started to radically change the society, globally, in all its aspects. Being based on the computing technology (in all its forms, digital and analog, that all now go under the name "digital"), which in its turn is based on information and data processing, which all goes back to cognition and intelligence of a cognizing agent in order to acquire meaning.

In the information age concept of information appears in virtually all fields of study and practice. Therefore, IS4SI also supports fields that use results of information studies for their specific applications, through the dissemination of research results across the disciplinary borders of variety of communities in the mutual process of learning between the theory and the communities of practice. In this way IS4SI enables the integration of the field and orient it towards the future, both based on technology and on the critical assessment on its social aspects.

Table 2. IS4SI Biannual summits since 2010

Year	Location	Summit Theme / Title
2011	IS4SI formally registered in Vienna, Austria	Institutional foundation of IS4SI, 24 June 2011.
2013	Moscow, Russia	Perspectives of Information in Global Education as a New Approach for the 21st Century
2015	Vienna, Austria	Information Society at the Crossroads
2017	Gothenburg, Sweden	Digitalization for a Sustainable Society — Embodied, Embedded, Networked, Empowered through Information, Computation & Cognition
2019	Berkeley, USA	Where is the I in AI and the Meaning in Information? (Information in AI / Intelligent Systems)
2021	Online (global, Tohoku, Japan)	Information Study for the Benefit of Humanity: Learning from the Past and Building the New Normal
2023	Beijing, China	Paradigm Change in the Information Discipline
2025	Varna, Bulgaria (hybrid)	The Key Role of Information Interaction - information in communication, biology, physics, social and mental domains.

Contributing Strands

The strong engagement of Chinese scholars in these early developments later led to the establishment of the ***IS4SI China Chapter***, which has since played an

important role in advancing information studies in the region and supporting the organization of major IS4SI events.

Alongside FIS, BITrum with its ongoing glossaLAB project, and SOII [Doucette, Bichler, Hofkirchner & Raffl, 2007], [SoII, 2025], there are numerous other contributions.

Additional roots of this integrative effort can be traced to the Inbiosa network, with its thematic special issues on integrative biology and information, as well as to the transdisciplinary philosophical project [*Contemporary Natural Philosophy and Philosophies, 2025*] (Part 1-3), which aims to foster collaboration between the natural, social and human sciences, the humanities and the arts. In 2023 GSIS, The Institute for a Global Sustainable Information Society was founded which since then contributed to IS4SI activities, [GSIS, 2025].

Alongside these direct contributors, a number of concurrent and partially overlapping research streams, such as work on symmetry, complexity, informational philosophy, information theory and biosemiotics, have developed in parallel to IS4SI, forming a broader intellectual landscape within which IS4SI operate.

Intellectual Trajectory

The history of IS4SI reveals a steady intellectual progression aimed at integrating multiple perspectives on information. From its early days in Madrid (1994), where researchers from various disciplines gathered to discuss the foundations of information science, to the more recent IS4SI summits, the society has become a global platform for interdisciplinary dialogue and knowledge exchange. Each summit has tackled key questions, including the nature of information in artificial intelligence [Berkeley, 2019] and the role of information in sustainable digitalization [Gothenburg, 2017]. The meeting in Vienna in 2015 went under the motto Information Society at the crossroads, while in 2013, in Moscow, the topic was Perspectives of Information in Global Education as a new Approach for the 21st century. Summit in 2021 was organized at Tohoku university Japan and held online (due to Covid). The 2023 summit was held in Beijing and online, on the topic *Paradigm Change in the*

Information Discipline. The 2025 Summit was held in hybrid format, online and in Varna, Bulgaria dedicated to the themes of *Interrelations between material and mental, correlating the notion of information in communication, biology, humanitarian areas and the physics of micro world*.

These discussions have not only refined theoretical understandings but have also connected to applied domains such as machine learning, artificial intelligence, and complex systems research [IS4SI Summits, 2025].

Broader Historical Context for the Emergence of IS4SI

According to the history of information science, [Araújo, 2021] the broader discipline dates back to the 1950s–1960s in its institutional emergence. Over the following decades (1970s–1990s) it expanded across library science, documentation, communication, computing, and early information theory. As Araújo demonstrates, the development of information science spans more than half a century, evolving from its institutional foundations through a period of disciplinary expansion and conceptual diversification.

This historical trajectory led to increasing differentiation and fragmentation and a corresponding need for systematic integration. The timeline below situates the emergence of the International Society for Information Studies (IS4SI) within this broader history, demonstrating how IS4SI represents a natural culmination of long-standing efforts to unify diverse approaches to information coordinating diverse research communities and scholars, connected by the interest on information and its various forms, theories, and applications.

Theoretical Foundations of Information Studies and Methodologies

Among the many intellectual contributions associated with IS4SI, one of the most significant has been the sustained exploration of theoretical information studies, reflected in a rich body of publications authored and edited by members of the society. A major line of work has focused on defining information as a fundamental and universal phenomenon influencing both natural and artificial systems. The collection of essays *Theoretical Information Studies: Information in the World* [Burgin and Dodig-Crnkovic, 2020] identifies information as a foundational principle underlying processes across physical, biological,

cognitive, social, and technological domains. This perspective aligns with IS4SI's mission to synthesise diverse disciplinary approaches into a coherent theoretical framework.

Another important direction within IS4SI scholarship emphasizes methodological pluralism and the need for transdisciplinary and multi-perspectival approaches to the study of information. Works such as *Philosophy and Methodology of Information* [Dodig-Crnkovic and Burgin, 2019], *Information Studies and the Quest for Transdisciplinarity* [Hofkirchner and Burgin, 2017], and *Theory of Information: Fundamentality, Diversity and Unification* [Burgin, 2009] demonstrate the necessity of combining philosophical, scientific, technological, and societal perspectives. These publications argue that no single discipline can fully encapsulate the complexity of information phenomena and that conceptual progress depends on dialogue and collaboration across specialized fields.

Further elaborations are offered in *Ontological Information: Information in the Physical World* [Krzanowski, 2022], *Information and Complexity* [Burgin and Calude, 2017], and *Emergent Information: A Unified Theory of Information Framework* [Hofkirchner, 2017], which extend inquiry into physical foundations, relations between informational structures and complex systems, and integrated multi-level models of informational processes. A recent addition to this line of scholarship is *Understanding Information and Its Role as a Tool: In Memory of Mark Burgin*, [Schroeder, 2025]. This commemorative volume honours the influential contributions of Mark Burgin, whose extensive theoretical work and long-standing leadership were instrumental in shaping the intellectual foundations and community structure of IS4SI.

In parallel with these theoretical developments, conceptual integration efforts within the IS4SI community have been supported by long-standing collaborative initiatives such as BITrum, the Glossarium and glossaLAB projects, and the Science of Information Institute (SOII). These communities work to cultivate shared conceptual understanding and facilitate communication across disciplinary boundaries, reinforcing the theoretical aspirations expressed in the publications noted above. Through their sustained collaborative methodology,

they complement the book-based theoretical contributions by providing an active framework for interdisciplinary knowledge co-creation.

Information, Computation, Cognition and Intelligence

The emergence of artificial intelligence has renewed and intensified interest in the fundamental relationships between information, computation, cognition and intelligence, drawing attention to the need for theoretical frameworks capable of explaining informational processes across natural and artificial systems. Within IS4SI, this connection has been addressed through the perspective of info-computation, which proposes that information and computation are intrinsically interrelated aspects of the dynamics of physical, biological and cognitive processes. This view has been developed in discussions and publications such as *Information and Computation* [Dodig-Crnkovic and Burgin, 2011], where computation is presented not merely as an abstract mathematical process but as a fundamental mechanism underlying processes in nature and shaping our understanding of intelligence.

Cognition and intelligence have also been central to IS4SI inquiries, particularly in relation to representation and reality. In the collections *Representation and Reality in Humans, Other Living Organisms, and Intelligent Machines* [Dodig-Crnkovic and Giovagnoli, 2017] and *Computation, Information, Cognition* [Dodig-Crnkovic and Stuart, 2007], the authors explore how different systems—biological and artificial—construct and interpret reality through information processing. The study of complex information networks in *Information and Computation Nets* [Dodig-Crnkovic, 2009] focuses on the dynamics of distributed intelligence, offering insight into computation as unfolding in interacting informational structures. Related phenomena at the level of knowledge are studied in *Theory of Knowledge* [Burgin, 2016], which examines the organisation and evolution of knowledge as informational processes.

These theoretical advances concerning the relationships among information, computation, cognition and intelligence provide a foundation for understanding contemporary developments in artificial intelligence and digital technologies, thereby linking the conceptual work of IS4SI with its practical applications across scientific, technological and societal domains.

Applications of Information Studies Across Scientific, Technological, and Societal Domains

Beyond its theoretical contributions, IS4SI plays an important role in connecting foundational research on information with practical applications across scientific, technological and societal domains. This applied dimension is reflected in the themes of IS4SI summits, which address contemporary challenges such as the role of information in digital transformation and sustainable societal development (Gothenburg, 2017), the relationship between information and artificial intelligence (Berkeley, 2019), and the contribution of information studies to global education ecosystems (Moscow, 2013). More recent meetings have examined the role of information in post-pandemic recovery and the construction of new societal models (Tohoku, 2021), and the interrelations between information in communication, biology, physics, cognition and social organisation (Varna, 2025).

These engagements demonstrate the relevance of IS4SI to applied research fields including machine learning, complex systems science, computational modelling, human and artificial cognition, and the development of digital infrastructures. They also reflect growing societal interest in responsible and sustainable approaches to digital transformation. Through those activities, IS4SI strengthens the connection between theoretical frameworks and practical implementation, supporting knowledge transfer, interdisciplinary learning and socially responsible technological development.

International Academy for Information Studies IAIS and Future Developments

The International Academy of Information Studies (IAIS) was established by IS4SI during the sixth IS4SI summit, held in Beijing in August 2023 and organized by Yixin Zhong (Beijing University of Posts and Telecommunications). The creation of IAIS [IAIS, 2025] represents an important step in the institutional development of information studies, reflecting a long-standing aspiration within IS4SI to provide a sustained scholarly forum beyond the biannual summits.

The Academy was founded to address a fundamental problem in contemporary societies: knowledge fragmentation resulting from informational disarray. IAIS advocates for a new consilience among the sciences, humanities and the arts, grounded in the concept of information and its natural and artificial processes and flows. Advancing beyond the existing incongruities in the multidisciplinary use of the information concept is one of its principal goals. The rapid development of artificial intelligence further demands deep reflection on its conceptual, information-based foundations.

Achieving informational consilience requires the creation of a novel economy of thought, tracing information flows across natural, cognitive, cultural and social processes. From quanta and biomolecules to sensing, sense-making, learning and memory; from brain processes and natural intelligence to the roots of social complexity, to economic and political infospheres and the foundations of culture — their interconnections should be illuminated, bridging traditional disciplinary divides and outdated paradigms. The conceptual foundations of AI are rarely discussed explicitly and must be included in this informational panorama. Addressing this challenge constitutes a shared task for the IAIS community.

Looking ahead, IS4SI and its constitutive bodies and communities IAIS, FIS, and others continue to shape the future of information studies by addressing emerging challenges in theory of information and computation, artificial intelligence, information ethics, and sustainability. The book Chaos, Information, and the Future of Physics [Seaman, Rössler and Burgin, 2023] relates information to physics, while Understanding Information and Its Role as a Tool [Schroeder and Hofkirchner, 2025] explores facets of information as a tool. Ethical dimensions of AI, including concerns over bias and accountability, have become major topics in recent summits. The Future Information Society [Burgin and Hofkirchner, 2017] and The Logic of the Third [Hofkirchner, 2022] reflect those concerns. Additionally, information-driven sustainability is an emerging concept in this context.

Conclusion

The development of the International Society for Information Studies (IS4SI) reflects more than three decades of efforts to articulate and integrate diverse

approaches to the study of information. From the early Foundations of Information Science meetings to the formation of IS4SI in 2010 and the continued growth of its affiliated communities, the field has progressively moved toward a shared conceptual space capable of addressing the complexity of information in natural, cognitive, social and technological settings. The biannual IS4SI summits have played a central role in this development, providing forums for dialogue across disciplines and orientations, while generating themes that mirror both theoretical advances and the pressing challenges of the information age.

Alongside this historical trajectory, the Society's theoretical contributions have deepened the understanding of information as a foundational concept connecting computation, cognition, knowledge and intelligence. These perspectives not only illuminate the workings of natural and artificial systems but also offer a basis for responding to emerging questions surrounding artificial intelligence, digitalization and the transformation of contemporary societies. The practical applications explored across IS4SI meetings—ranging from machine learning and complex systems to communication, social governance and sustainability—demonstrate the increasing relevance of information studies to both scientific inquiry and societal needs.

The establishment of the International Academy of Information Studies (IAIS) in 2023 marks a significant step in consolidating and extending this intellectual foundation. By addressing the fragmentation of knowledge and advocating for informational consilience across the sciences, humanities and arts, the Academy strengthens IS4SI's mission and provides a sustained institutional framework for future development. IAIS is positioned to foster deeper conceptual reflection, stimulate new collaborations and support a global community of scholars dedicated to understanding information in all its forms and manifestations.

Together, IS4SI and IAIS constitute complementary pillars in the emerging landscape of information studies—one providing broad international coordination and dialogue, the other enabling sustained theoretical and integrative work.

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Appendices

Appendix 1. IS4SI Presidents and Secretaries

Appendix 2. IS4SI Board of Directors over the years

Appendix 3. International Academy of Information Studies (IAIS)

Appendix 4. Personal Reflections on the Development of Information Studies and AI, by Yixin Zhong

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Major Fields of Research: Philosophy of information, Philosophy of Computation, Cognition, Intelligence, Philosophy of Systems and Complexity

Appendix 1. IS4SI Presidents and Secretaries

Founding Presidents

Pedro Marijuán
(Spain)

Kang Ouyang
(China)

Wolfgang Hofkirchner
(Austria)

Presidents

2011 - 2013

Konstantin Kolin (Russian Federation)

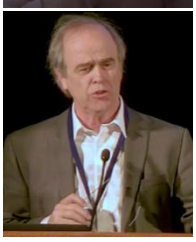
2013 - 2015

Wolfgang Hofkirchner (Austria)

2015 - 2017

Gordana Dodig-Crnkovic (Sweden)

2017 - 2019



Terrence Deacon (United States of America)

2019 - 2021  Marcin Schroeder (Japan)

 Yishin Zhong (China)

2021 - 2023  Pedro Marijuán (Spain)

2023 - 2025  Krassimir Markov (Bulgaria)

 José María Díaz Nafría (Spain)

2025 - 2027  Teresa Guarda (Portugal)

General Secretaries

2011 - 2017  Robert Jahn (Austria)

2017 - current  Annette Grathoff (Austria)

Appendix 2. IS4SI Board of Directors over the years

2025-2027

Presidents	José María Díaz Nafría & Teresa Guarda
Immediate Past President	Krassimir Markov
Presidents Elect	Lorenzo Magnani & Jordi Vallverdu
VP* for Protocol	Pedro Marijuan
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	Jordi Vallverdu & Raffaela Giovagnoli
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Wu Kun & Zhicheng Chen
VP for Regional Chapters	Yixin Zhong
VP for Archives	Shigeo Kawashima
VP for Research	Gordana Dodig-Crnkovic
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Jorge Navarro López
VP for Publications	Lorenzo Magnani
VP for Communication	Daniel Boyd & Irena Mostowicz

2023-2025

President	Krassimir Markov
Immediate Past Presidents	Pedro Marijuán & Yixin Zhong
Presidents Elect	Teresa Guarda & José María Díaz Nafría
VP for Protocol	Gordana Dodig-Crnkovic
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	José María Díaz Nafría
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Zhicheng Chen
VP for Regional Chapters	Shigeo Kawashima
VP for Archives	Wu Kun
VP for Research	Marcin Schroeder
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Jorge Navarro López
VP for Publications	Teresa Guarda
VP for Communication	Daniel Boyd

*VP: Vice President

2021-2023

Presidents	Pedro Marijuán & Yixin Zhong
Immediate Past President	Marcin Schroeder
President Elect	Krassimir Markov
VP for Protocol	Gordana Dodig-Crnkovic
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	José María Díaz Nafría
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Zhicheng Chen
VP for Regional Chapters	Shigeo Kawashima
VP for Archives	Wu Kun
VP for Research	Krassimir Markov
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Jorge Navarro López
VP for Publications	Mark Burgin/Wolfgang Hofkirchner
VP for Communication	Teresa Guarda

2019-2021

President	Marcin Schroeder
Immediate Past President	Terry Deacon
Presidents Elect	Pedro Marijuán & Yixin Zhong
VP for Protocol	Gordana Dodig-Crnkovic
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	Josef Brenner
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Zhicheng Chen
VP for Regional Chapters	Tadashi Takenouchi
VP for Archives	Wu Kun
VP for Research	Søren Brier
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Luis Emilio Bruni
VP for Publications	Mark Burgin
VP for Communication	José María Díaz Nafría

2017-2019

President	Terry Deacon
Immediate Past President	Gordana Dodig-Crnkovic
President Elect	Marcin Schroeder
VP for Protocol	Pedro Marijuán
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	Josef Brenner
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	-
VP for Regional Chapters	Tadashi Takenouchi
VP for Archives	Wu Kun
VP for Research	Søren Brier
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Luis Emilio Bruni
VP for Publications	Mark Burgin
VP for Communication	José María Díaz Nafría

2015-2017

President	Gordana Dodig-Crnkovic
Immediate Past President	Wolfgang Hofkirchner
President Elect	Terry Deacon
VP for Protocol	Pedro Marijuán
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	Josef Brenner
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Marcin Schroeder
VP for Regional Chapters	Tadashi Takenouchi
VP for Archives	Wu Kun
VP for Research	Søren Brier
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Luis Emilio Bruni
VP for Publications	Mark Burgin
VP for Communication	José María Díaz Nafría

2013-2015

President	Wolfgang Hofkirchner
Immediate Past President	Konstantin Kolin
President Elect	Gordana Dodig-Crnkovic
VP for Protocol	Gordana Dodig-Crnkovic
VP for Funds	Wolfgang Hofkirchner
VP for Transdisciplinary Projects	Josef Brenner
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	-
VP for Regional Chapters	Tadashi Takenouchi
VP for Archives	Wu Kun
VP for Research	Marcin Schroeder
VP for Educational Affairs	Yagmur Denizhan
VP for Conferences	Luis Emilio Bruni
VP for Publications	Mark Burgin
VP for Communication	José María Díaz Nafría

2011-2013

President	Konstantin Kolin
Immediate Past President	Kang Ouyang
President Elect	Wolfgang Hofkirchner
VP for Protocol	Pedro Marijuán
VP for Funds	Katherine Sariakis
VP for Transdisciplinary Projects	Josef Brenner
VP for Institutional Membership	Xueshan Yan
VP for Special Interest Groups	Peter Fleissner
VP for Regional Chapters	Toru Nishigaki
VP for Archives	Zong-Rong Li
VP for Research	Gordana Dodig-Crnkovic
VP for Educational Affairs	Elisabeth A. Buchanan
VP for Conferences	Luis Emilio Bruni
VP for Publications	Michael Petitjean
VP for Communication	José María Díaz Nafría

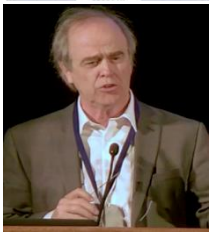
Appendix 3.
International Academy of Information Studies (IAIS)

IAIS CHAIRS

Yixin Zhong

Emeritus Professor, BUPT

Beijing University of Posts and Telecom



Terrence Deacon

Professor, Anthropology & Neuroscience

University of California, Berkeley

IAIS GOVERNING BOARD

Pedro Marijuán

Senior Researcher, Bioinformation Group

Aragon Health Sciences Institute, Spain

Plamen Simeonov

Director of Research,

InBioCe, Berlin, Germany

Gordana Dodig-Crnkovic

Professor, Chalmers University of Technology

Senior Professor, Mälardalen University, Sweden

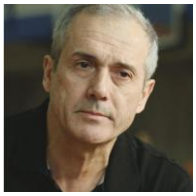
Eric Werner

Senior Researcher,

Oxford Advanced Research Foundation

IAIS FELLOWS

Adamatzky, Andrew:
Computer science, unconventional computing, robotics, artificial intelligence.
https://people.uwe.ac.uk/Person/AndrewAdamatzky



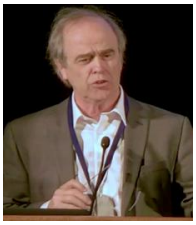
Bejan, Adrian:
Engineering, thermodynamics, constructal law: theory of design and morph evolution.
https://en.wikipedia.org/wiki/Adrian_Bejan

Boltuc, Peter:
AGI, philosophy of visual processing.
https://www.uis.edu/directory/peter-boltuc

Bloom, Howard:
Writer, musical & media analyst, multidisciplinary social science, international commentator.
https://en.wikipedia.org/wiki/Howard_Bloom

Buzsáki, György:
Mathematics, network science, neuroscience, biomolecular systems.
https://med.nyu.edu/faculty/gyorgy-buzsaki

Damásio, António:
Neuroscience, psychology, philosophy, the role of emotions for cognition.
https://dornsife.usc.edu/profile/antonio-damasio/



Deacon, Terrence:
Information science, neurobiology, cognitive science, anthropology, biosemiotics.
https://berkeley.academia.edu/TerrenceDeacon

DeFelipe, Javier:
Neurobiology, neurophysiology, neuroanatomy, neuronal information processing.
https://en.wikipedia.org/wiki/Javier_de_Felipe

Dodig-Crnkovic, Gordana:
Natural computing, basal cognition, agency, foundations of information, computing and philosophy. https://www.gordana.se/

Érdi, Péter:
Neural networks, computational neurology, chemical networks, complexity.
http://cneuro.rmki.kfki.hu/people/erdi/

Friston, Karl J.:
Neuroscience, neuroinformation, biological processing systems, principles of optimization, biomedicine and theoretical biology.
https://profiles.ucl.ac.uk/2747-karl-friston

Fletcher, Roland:
Theory of archaeology, social and cultural evolution, large timescale of cultural phenomena, Director of Greater Angkor Project.
https://www.researchgate.net/profile/Roland-Fletcher-2

Gare, Arran:
Environmental philosophy, philosophy of science and culture, complexity and process science.
https://philpapers.org/s/Arran%20Gare

Görnitz, Thomas:
Mathematics, quantum theory, cosmology, theory of consciousness. https://tinyurl.com/2kp8dmmh

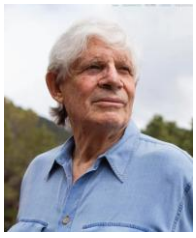
Han, Liqun:
Neuroscience, cognitive science, artificial human brain, AI education.
https://ieeexplore.ieee.org/author/37088010457

He, Huacan:
Artificial intelligence, universal logic, applied computer science, technological information.
https://ieeexplore.ieee.org/author/37087584639

Hofkirchner, Wolfgang:
Information theory, social information, systems science and sustainability, technology and social complexity. https://socialontology.org/wolfgang-hofkirchner/

Igamberdiev, Andrei:
Biophysics, molecular biology, plant science, biomolecular information processing, philosophy.
https://www.mun.ca/biology/aigamberdiev/

Kauffman, Louis:
Mathematics, topology, logics, complexity theory.
https://homepages.math.uic.edu/~kauffman/



Kauffman, Stuart:
Theoretical biology, complexity science, philosophy, knowledge systems, social evolution.
https://en.wikipedia.org/wiki/Stuart_Kauffman

Koppl, Roger:
Theory of economic growth, complexity theory, production and distribution of knowledge in society.
https://news.syr.edu/faculty-experts/roger-koppl/

Korotayev, Andrey:
Social science, economy, political science, social modeling. https://hse-ru.academia.edu/AndreyKorotayev

Lebedev, Mikhail:
Neurobiology, neurorobotics, bioelectric Interfaces, cognitive neuroscience.
https://sites.google.com/site/lebedevneuro/curriculum-vitae

Levin, Michael:
Developmental biology, biomolecular information processing, biological complexity, evolutionary theory.
https://as.tufts.edu/biology/people/faculty/michael-levin

Marijuán, Pedro:
Biological information, information science, social information, social complexity.
Google Scholar: https://tinyurl.com/398m39vt

Markov, Krassimir:
General information theory, computer science, cognition, and natural language processing.
http://www.ithea.org/markov

Ouyang, Kang:
Social epistemology, cross-cultural studies, social information, social science and philosophy in China.
https://thehumanities.com/about/history/2017-conference/ouyang-kang

Panetsos, Fivos:
Neuroscience, brain plasticity, biomaterials, artificial tissues. https://loop.frontiersin.org/people/26085/bio

Petitjean, Michel:
Symmetry and chirality, chirality mathematical measures, cheminformatics, bioinformatics.
http://petitjeanmichel.free.fr/itoweb.petitjean.html

Rovelli, Carlo:
Physics, cosmology, quantum gravity, fundamental theories. https://sv.wikipedia.org/wiki/Carlo_Rovelli

Schröder, Marcin:
Philosophy, physics, mathematics, information theory.
https://en.wikipedia.org/wiki/Marcin_Schroeder

Shi, Zhongzhi:
Intelligence science, machine learning, knowledge representation.
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Simeonov, Plamen:
Integral biomathics, theoretical biology, impredicativity, natural philosophy, noesis studies, anthropology and time.
www.simeio.org/focus/

Sloman Aaron:
Mathematics, Physics, Philosophy of Mathematics. Current research on the meta-morphogenesis.
https://www.birmingham.ac.uk/staff/profiles/computer-science/honorary-staff/sloman-aaron

Stepney, Susan:
Unconventional computing, artificial life, artificial chemistries, open-ended evolution, complex systems simulation. https://www.cs.york.ac.uk/people/susan

Timsit, Youri:
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Vedral, Vlatko:
Quantum physics, quantum information science, information theory. https://www.physics.ox.ac.uk/our-people/vedral

Wang, Peizhuang:
Mathematical foundations, fuzzy logic, information science.

Werner, Eric:
Distributed artificial intelligence, multi-agent systems, computational developmental biology, logic of information. https://www.ericwerner.com/

Wu, Kun:
Information philosophy, social complexity, systems science. https://tinyurl.com/mvz492dh

Yan, Xueshan:
General information science, information economics, information management.
https://www.researchgate.net/profile/Xueshan-Yan

Zhang, Yanning:
Space sciences, information processing, theoretical optics, intelligent optical processing systems.
https://ieeexplore.ieee.org/author/37292467300 ;
https://qm.nwpu.edu.cn/info/1086/9277.htm

Zhong, Yixin:
Information science, advanced artificial intelligence, ecology of knowledge, information science.
https://ieeexplore.ieee.org/author/37087417213

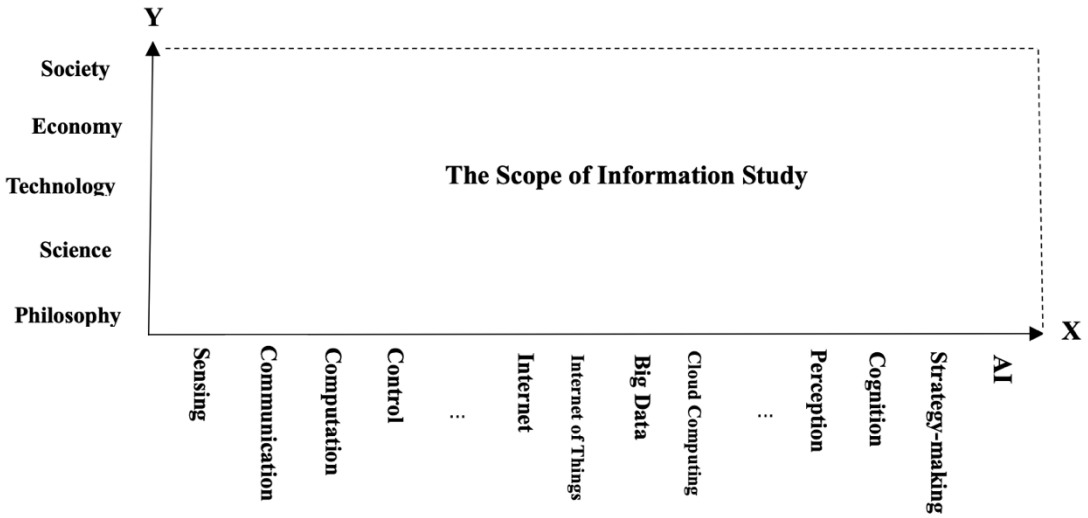
Appendix 4.

Personal Reflections on the Development of Information Studies and AI

Yixin Zhong

1. Understanding the Scope of Information Study

The scope of information study can be understood along two dimensions.



On the X-axis are various components of information functions, ranging from the simplest to the most complex, such as sensing, computation, communication, control, perception, cognition, strategy, and cloud computing, as well as Internet technologies, the Internet of Things, big data, and related developments.

On the Y-axis are various domains of informational activities, including information philosophy, information science, information technology, information economy, and information society.

Note 1. The X-axis represents components of information functions from elementary to advanced levels, while the Y-axis represents areas of informational activity.

Note 2. "Science" in this context refers to all branches of science in which information flow plays a major role. Biological science, neuroscience, bacterial science, medical science, and related fields are included under science and therefore are not listed independently.

Note 3. The left and middle parts of the X-axis correspond to elementary branches of information science, in which only syntactic information is considered. The right part corresponds to advanced branches of information science, where comprehensive information—comprising syntactic, semantic, and pragmatic information—is required. These advanced branches are essential components of artificial intelligence, which must understand meaning (semantics) and utility (pragmatics).

Note 4. All branches on the X-axis are, to some extent, institutional components of artificial intelligence, which is the most complex and highest-level domain within information science. Therefore, AI (as well as intelligence science) constitutes the most significant chapter of information studies.

2. Information Study in China and the Event of 2010

In 1962, a book titled Information Theory (in Chinese) was published by Professor Changnian Cai. In 1964, the Chinese Society on Information Theory (CSIT) was established under the umbrella of the Chinese Institute of Electronics (CIE). The academic conferences organized by CSIT focus on Shannon's statistical information theory and are held biennially.

In 1988, an important book titled Foundations of Information Theory and Its Mathematical Knowledge (in Chinese) was published by Professor Jiongpan Zhou, then president of CSIT. Weiling Wu, Daoben Li, Yixin Zhong, and Huimin Zhang were among the most active members of CSIT. All of the above scholars were faculty members of Beijing University of Posts and Telecommunications (BUPT), and the two books mentioned were published by BUPT Press.

Meanwhile, scholars from Xidian University and Nankai University were also highly active in information theory research. Xidian University contributed

particularly to coding theory, while Nankai University made important contributions to the mathematical foundations of information theory.

In 1986, Yixin Zhong published an article titled Comprehensive Information Theory (in Chinese) through BUPT Press. This work was not intended for communication engineering but rather to support research in artificial intelligence. As noted above, comprehensive information is understood as the trinity of syntactic, semantic, and pragmatic information. Shannon information is therefore a special case of comprehensive information.

2.1 The 2010 Event in Beijing

In 2001, Yixin Zhong was elected President of the Chinese Association for Artificial Intelligence (CAAI). During this period, the National Conference on Artificial Intelligence (NCAI) was organized annually, and the International Conference on Artificial Intelligence (ICAI) was organized biennially.

Because information is the fundamental source of intelligence, comprehensive information became a critical issue in AI research. Both NCAI and ICAI placed greater emphasis on comprehensive information rather than on purely statistical syntactic information as defined by Shannon theory.

During the preparation of ICAI 2010, Professor Kang Ouyang of Huazhong University of Science and Technology (HUST) proposed that a group of scholars working on the foundations of information science be included in the ICAI 2010 program as a special session. Since foundational information science is an important component of artificial intelligence (see Note 3 above), this proposal was accepted. As a result, Chinese scholars and scholars from the Foundations of Information Science (FIS) community met together at ICAI 2010.

On the evening of the closing day, Yixin Zhong and Huacan He (representing ICAI), Pedro Marijuan and Wolfgang Hofkirchner (representing FIS), and Kang Ouyang and Zongrong Li (representing HUST) met to discuss the establishment of an international organization for information studies, with Beijing initially considered as a possible headquarters.

As host of ICAI, Yixin Zhong expressed strong support for the initiative to establish an international society for information studies. However, it was also explained that China was not yet sufficiently prepared to host the headquarters of an international organization at that time, and that other countries and cities should be considered. Wolfgang Hofkirchner subsequently proposed Austria as a suitable location.

In 2011, Wolfgang Hofkirchner successfully registered the International Society for Information Studies (IS4SI) in Austria.

3. Why a Paradigm Revolution in AI Should Be Emphasized by IAIS

The following considerations motivate the emphasis on a paradigm revolution in artificial intelligence.

3.1 The Mission of IAIS

Information studies, and AI in particular, are entering a period of remarkably rapid development. The purpose of establishing the International Academy of Information Studies (IAIS) is to focus sustained effort on the most profound and significant trends in information studies, especially in AI, so that IAIS can provide global leadership and make meaningful contributions to humanity.

3.2 AI as an Interdisciplinary Field in the 21st Century

As noted above, AI is the unique domain within information studies that comprehensively represents the entirety of the field and constitutes its most significant component. Consequently, AI has the strongest potential impact on the development of science and technology, the economy, and human society in the twenty-first century.

3.3 AI Requires a New Research Paradigm

For the past four hundred years, the mainstream paradigm in natural science has been that of physical science, including material and energy sciences.

Artificial intelligence, which emerged in the mid-twentieth century, is a fundamentally new scientific field. Because AI takes human subjective thinking as its research object, whereas physical sciences focus on objective entities, the paradigms of physical science are not suitable for AI research.

AI therefore requires a new paradigm of study. For further discussion, see the article Paradigm Revolution in AI, published by World Scientific.

The difficulties currently faced by large language models demonstrate that their fundamental limitation lies in the adoption of paradigms derived from physical science, which are not appropriate for AI. This serves as a serious warning that AI research paradigms must undergo substantial transformation. Addressing this challenge should be a core responsibility of IAIS.

Summary

Since artificial intelligence is the most significant domain within information studies and requires a new research paradigm, colleagues within IAIS are encouraged to place greater emphasis on the theme of a paradigm revolution in AI. Such an emphasis will better align information studies with the societal demands of the mid-twenty-first century.

Appendix 4 Author's Information

Yixin Zhong - *Emeritus Professor, BUPT, Beijing University of Posts and Telecom, China*

Major Fields of Research*: Information science, advanced artificial intelligence, ecology of knowledge, information science.*
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