

HPS&ST Note

May 2019

Introduction

This HPS&ST monthly note is sent direct to about 7,600 individuals who directly or indirectly have expressed an interest in the contribution of history and philosophy of science to theoretical, curricular and pedagogical issues in science teaching, and/or interests in the promotion of innovative and more engaging and effective teaching of the history and philosophy of science. The note is sent on to different international and national HPS lists and international and national science teaching lists. In print or electronic form it has been published for 20+ years.

The note seeks to serve the diverse international community of HPS&ST scholars and teachers by disseminating information about events and publications that connect to concerns of the HPS&ST community.

Contributions to the note (publications, conferences, opinion pieces, etc.) are welcome and should be sent direct to the editor:

Michael R. Matthews, UNSW, m.matthews@unsw.edu.au.

The Note, along with RESOURCES, OBITUARIES, OPINION PIECES and more, are lodged at the website:

<http://www.hpsst.com/>



International Congress on the History of Science in Education, May 30 – June 1, 2019, Vila Real, Portugal

The programme, featuring five plenary lectures and 200 individual presentations, is now available on the conference website [here](#).

The conference is a joint organization of the University of Trás-os-Montes and Alto Douro (UTAD), University of Porto (UP), University of Coimbra (UC) and University of S. Paulo (USP).

Plenary Speakers:

- Carlos Fiolhais, Physics, Universidade de Coimbra
- Jorge Varanda, Anthropology, University of Coimbra
- Maria Elice Prestes, Biology, Universidade de São Paulo
- Michael Matthews, Education, University of New South Wales

Conference Chair:

- Isilda Rodrigues, isilda@utad.pt

Depart. Education and Psychology,

University of Trás-os-Montes e Alto Douro, UTAD, Vila Real, Portugal.

Information available [here](#).

**15th International History, Philosophy and Science Teaching Group
(IHPST) Biennial Conference, Thessaloniki, July 15-19, 2019**



12th Cent. White Tower



School of Education, Aristotle University

The conference will take place at the Aristotle university of Thessaloniki which was founded in 1925 and occupies an area of 33 hectares in the city centre.

The conference will open on Monday afternoon with registration, an opening session and a welcome reception. On Tuesday, Wednesday and Thursday there will be full-day presentations. There will be scheduled opportunity to visit cultural sites and events in Thessaloniki.

Important Dates:

Abstract submission: January 20, 2019

Final paper submission: March 20, 2019

Full conference information available [here](#).

Conference Chair: A/Professor Fanny Seroglou: ihpst2019@eled.auth.gr

epISTEME 8, January 3 - 6, 2020, Mumbai, India

epISTEME is a biennial international conference to review research in science, technology and mathematics education (STME), hosted by the Homi Bhabha Centre for Science Education (HBCSE), Mumbai, India. The primary aim of epISTEME conferences is to nurture and promote scholarship in STME research in India, an area that holds great potential owing to our huge, aspiring student and teacher population. Now in its 8th year, epISTEME is arguably the flagship STME research conference in India. Details of the past seven editions are available [here](#).

Submissions are invited for oral or poster presentations along any of the following four Strands:

- Strand 1: Historical, philosophical and socio-cultural studies of STME: implications for education
- Strand 2: Cognitive and affective studies of STME
- Strand 3: Language, Pedagogy and Curriculum in STME
- Strand 4: Discipline-based education research

Instructions for submitting papers are available [here](#). Online Registration link for all participants (including those wishing to attend without submitting a paper) will be announced soon.

Invited Speakers

- Tamer Amin (American University of Beirut, Lebanon)

- Sanjay Chandrasekharan (HBCSE, TIFR, India)
- Mei-Hung Chiu (National Taiwan Normal University, Taiwan)
- Ralph Levinson (UCL Institute of Education, UK)
- R. Ramanujam (The Institute of Mathematical Sciences, India)
- Manjula Sharma (University of Sydney, Australia) - To be confirmed

Important Dates

- Deadline for submission of papers: June 15, 2019
- Notification of acceptance: August 15, 2019
- Submission of revised papers: September 20, 2019
- Participation application (without paper submission) starts on: September 1, 2019
- Registration starts on: September 1, 2019
- Deadline for registration: October 10, 2019
- Conference: January 3 - 6, 2020

Contact

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- Email: episteme8@hbcse.tifr.res.in

New Editor of Science & Education Journal

A successor to Dr Kostas Kampourakis as editor of the journal *Science & Education* has been chosen by the IHPST Council and approved by Springer Publishers.

Sibel Erduran is Professor of Science Education at Oxford University. After a transition period working with Dr. Kampourakis, she will assume editorship at the beginning of 2020. Prior to her appointment at Oxford, she was the Chair of STEM Education at University of Limerick, Ireland. She held a Distinguished Chair Professor position at National Taiwan Normal University as well as Visiting Professorships at Kristianstad University, Sweden, and Bogazici University, Turkey.



She has worked at University of Pittsburgh, King's College, University of London and University of Bristol, United Kingdom. She is an Editor for *International Journal of Science Education*, and a Section Editor for *Science Education*.

She completed her higher education in the USA at Vanderbilt (PhD Science Education & Philosophy), Cornell (MSc Food chemistry) and Northwestern (Biochemistry) Universities. She was a chemistry teacher in a high school in northern Cyprus. Her research interests focus on the applications in science education of epistemic perspectives on science in general and in chemistry in particular. Her work on argumentation has received awards from NARST and EASE.

What are the Philosophical and Interdisciplinary Foundations of STEM Education?

Science & Education Journal invites papers investigating the interdisciplinary underpinnings of STEM (short for science, technology, engineering and mathematics) and STEM education. The interdisciplinary underpinnings can include historical, philosophical and sociological approaches. In recent years there has been increasing emphasis on STEM education in international curriculum and policy documents (National Science and Technology Council, 2013; The Royal Society Science Policy Centre, 2014). A key argument in the proposals for STEM education is that science, technology, engineering and mathematics workers play a pivotal role in economic growth and STEM education produces critical thinkers, scientifically literate professionals and citizens, and enables the next generation of innovators. The infusion of “engineering practices” in the Next Generation Science Standards in the USA signals curriculum policy level argument for STEM teaching and learning that integrates related domains to science teaching and learning. Furthermore, there has been plethora of journals, research centres and community organisations that have made STEM a central educational goal, and many funding agencies are supporting research and development efforts to make STEM education effective.

But what exactly does STEM mean? Is the concept of “STEM” authentic? Is there a particular nature to STEM or are there disciplinary variations across science, technology, engineering and mathematics? What are the epistemic, cognitive, cultural and social underpinnings of STEM and what do they imply for STEM education? The journal invites theoretical and empirical papers that address related questions that include but are not exclusive to the following:

- What are the community practices of professionals in STEM fields and what do these practices imply for STEM education?
- What is the impact of incorporating STEM practices in education on learners and teachers?
- What professional development programmes can be designed to improve

pre-service and in-service teachers' understanding of the nature of STEM and STEM disciplines?

- What are the epistemological aims and values of science, technology, engineering and mathematics? Do these aims and values overlap or are they distinct in each discipline?
- Are the arguments for the collective and interdisciplinary teaching of science, technology, engineering and mathematics justified from an epistemological point of view?
- What informal learning opportunities are there to encourage understanding of the historical, philosophical and sociological accounts of STEM?
- What are the implications of potential epistemological variation in the STEM disciplines for teaching and professional development of teachers?
- What can scholarship in history, philosophy, sociology and related meta-perspectives on science contribute to policy studies on STEM education?

Editorial team

The following editorial team will manage the review process for this special issue:

- Editor-in-Chief: Sibel Erduran, University of Oxford, United Kingdom
- Associate Editor: Olivia Levrini, University of Bologna, Italy
- Associate Editor: Maurício Pietrocola, University of São Paulo, Brazil
- Book Reviews Editor: Gábor Áron Zemplén, Budapest University of Technology and Economic, Hungary

Deadline for submission of papers: October 30th, 2019

Submission procedure Instructions for the preparation and submission of manuscripts can be accessed at the following website [here](#).

Interactive Historical Atlas of the Disciplines

The University of Geneva has established a rich web resource: “Interactive Historical Atlas of the Disciplines”. The website is in open access [here](#).

This atlas aims at mapping the evolution of the disciplinary borders of science over time, as well as tracing back the successive redefinitions of scientific disciplines throughout the centuries. Furthermore, the project is open to scholarly (reviewed) participation: each disciplinary map comes with dedicated tools for adding content or bibliographic entries.

Further information from:

Raphaël Sandoz, University of Geneva, sandoz.raphael@gmail.com

University of Pittsburgh HPS Programme and Events

The Center for Philosophy of Science at the University of Pittsburgh is pleased to announce a call for applications for PSP3: A Summer Program in Philosophy of Science for Underrepresented Groups, which will be held in Pittsburgh from July 15 to July 19, 2019.

Center for Philosophy of Science
University of Pittsburgh
Edouard Machery, Director
pittcntr@pitt.edu

For details and to apply, visit www.pitt.edu/~pittcntr



Scientific Literacy for All, Beijing Normal University, Oct. 29-30, 2019

The Collaborative Innovation Center of Assessment toward Basic Education Quality (CICA-BEQ) at Beijing Normal University will host a conference on 'Improving Scientific Literacy for All', Tuesday, Oct. 29 – Wednesday, Oct. 30, 2019

Scientific literacy is evolving as an essential literacy for modern citizens, due to the rapid development of science and technology in the 21st century. To clarify this fundamental aspect of science education in this new era, we need to rethink and redefine the concept of scientific literacy. Driven by the evolution of scientific literacy, systemic reforms embedded in data-driven and technology-based approaches are needed to improve science education quality. The AISL 2019 conference examines four essential topics to guide research and practice in scientific literacy:

1. Scientific literacy in the 21st century;
2. Teaching, learning and assessment;
3. Curriculum and digital resources;
4. Science teacher professional development.

Keynote Speakers:

Richard A. Duschl, Lyle School of Engineering, Southern Methodist University

Sibel Erduran Department of Education, Oxford University

Joseph Krajcik CREATE for STEM Institute, Michigan State University

For More Information see [here](#).

Email: bnukxts@126.com.

Interview with Mario Bunge

It is hoped that Mario Bunge, the Argentine/Canadian physicist and philosopher will celebrate his 100th birthday on September 21 this year. He was interviewed in 2015 by Gustavo Romero for the Spanish site 'Philosophy on the Net' [with English translation available] [here](#).

Gustavo E. Romero is Professor of Relativistic Astrophysics at the University of La Plata and Superior Researcher of the National Research Council (CONICET) of Argentina.

He is former President of the Argentine Astronomical Society and Helmholtz International Fellow.

His main current interest is on high-energy astrophysics, black hole physics and ontological problems of spacetime theories.

The interview ranges over physics, philosophy of physics, history of philosophy, philosophy of science and the social responsibility of scientists. The final question was:

17. Let me end by asking you about your aesthetic tastes. Could you mention some fiction artists and writers that you hold in esteem?

17. 1. I do not fall asleep without first reading some pages of a novel. Great novelists inspire me with as much respect and affection as great scientists and philosophers. The same thing happens with the great playwrights and comedigraphers, such as Aristophanes, Lope, Molière and Wilde. On the other hand, tragedies and poetry leave me cold.



Mario Bunge at 99

17. 2. Since I was a teenager, I liked to explore the literatures of all countries. I think *Don Quixote*, *The Human Comedy* and *War and Peace* are the summits of the universal novel. But I have “discovered” great novelists in all the countries I have visited [...] and I am excited by some of the countries I have never visited, such as Albania (Ismail Kadaré), Trinidad and Tobago (Vidiadhar Surajprasad Naipaul), and South Africa (J.M. Coetzee). I also like Eça de Queirós, Jorge Amado, Alejo Carpentier, Gabriel Delibes, Mario Vargas Llosa, Naim Süleymanoğlu, Vonnegut, Narayan, Le Clézio, Margaret Atwood, Peter Carey, Philip Roth, Sinclair Lewis, Anatole France, Italo Calvino, José Saramago, Carlos Fuentes, Orhan Pamuk and others.

Opinion Page

The Metaphysics of Science and Aim-Oriented Empiricism

Nicholas Maxwell, Philosophy, University College, London

Since around 2007, a burgeoning new field of research in philosophy has come into existence, called “the metaphysics of science” which is really the rebirth of a very old subject. I have contributed to this field in a book published by Springer in early 2019: *The Metaphysics of Science and Aim-Oriented Empiricism*.

The book elaborates and extends my little-attended-to arguments of thirty years ago seeking to improve metaphysical assumptions concerning the unity or physical comprehensibility of the universe as an integral part of scientific research. The book further argues for the need to transform our universities, our institutions of learning, so that they become able to help humanity learn what it so desperately needs to learn how to resolve conflicts and problems of living in increasingly cooperatively rational ways.



I have worked in this area for some time. There have been two waves of output. The first wave of was devoted to the mind-body problem – or to the broader and more general human world/physical universe problem: How can our human world exist and best flourish embedded as it is in the physical universe? My research was devoted to this problem from about 1964 to 1968. Snippets of this work had an impact on philosophy via the subsequent publications of Thomas Nagel and Frank Jackson.

The second wave of my early work on the metaphysics of science began around 1968. It began with a criticism of Karl Popper. In one way, Popper was a revolutionary; he held that theories cannot be verified in science, only refuted. In another

way, Popper was highly traditional; he held the basic aim of science is truth, and the method is to assess theories impartially with respect to evidence. I discovered that this highly traditional idea is false. Physics only ever accepts unified theories even though endlessly many disunified rivals can always be concocted to be even more successful empirically. This persistent acceptance of unified theories only, when endlessly many empirically more successful disunified rivals exist, means that physics makes a persistent metaphysical assumption about the universe: it has some kind of unified dynamic structure.

Precisely because this largely implicit assumption is profoundly influential, purely conjectural, and almost bound to be false in the specific form in which it is held at any stage in the development of physics, it is vital that it is made explicit within the context of physics, so that it can be critically assessed, so that alternatives can be developed and assessed, in the hope of improving the assumption that is made.

All this leads to a new conception of science, and a new kind of science, which explicitly acknowledges the profoundly problematic aims of science, and seeks to improve aims and associated methods, as science proceeds. I have argued this point in 1972 and 1974 papers. This discovery about the irrationality of current orthodox conceptions of science, and the need to develop a new conception and kind of science which acknowledges the real, problematic aims of science, and seeks to improve aims and methods as science proceeds, has implications for the whole academic enterprise.

Judged from the standpoint of helping to promote human welfare, academic inquiry devoted in the first instance to the pursuit of knowledge is damagingly irrational in a wholesale, structural way. And this damaging structural irrationality of humanity's institutions of learning is, in part, responsible for the genesis of our current grave global problems, and our current incapacity to resolve them.

We need to bring into existence a new kind of inquiry that has, as its basic intellectual aim, wisdom and not just knowledge – wisdom being the capacity, active endeavour and desire to realize what is of value in life, for oneself and others, wisdom including knowledge, technology and understanding, but much else besides.

A basic task of the new kind of academic inquiry would be to help humanity improve aims and methods of great social endeavours – industry, agriculture, politics, the media, the law, economics – so that we may gradually make social progress in seeking to attain the profoundly problematic aim of a good world.

Granted that a proper basic aim of academia is to help promote human welfare, a basic task must be to (1) articulate, and try to improve the articulation of, our problems of living; and (2) propose and critically assess possible solutions – possible actions, policies, social arrangements, institutions, ways of living, philosophies of life. Inquiry as it is at present, devoted primarily to the pursuit of knowledge, cannot do this. It gives intellectual priority to tackling problems of knowledge, not problems of living. Modern science and technological research, pursued in this way, have been a mixed blessing. They have led to great benefits. They have made the modern world possible. But they have also made possible the development of almost all of our current global problems that threaten the future of humanity and our world.

For science and technology have made possible modern industry, agriculture and fishing, modern hygiene and medicine, modern armaments, which in turn have made possible population growth, destruction of natural habitats, loss of wild life and rapid extinction of species, the lethal character of modern war, the threat posed by nuclear weapons, immense inequalities in wealth and power around the globe, pollution of earth, sea and air, and perhaps most serious of all, the impending disasters of climate change.

We need to learn how to solve these immense problems. For that, we need in place institutions of learning rationally designed and devoted to the task. It is just that that we do not have at present. Indeed, academia as it exists at present, devoted in the first instance to acquiring knowledge and technology, is almost designed to help make matters worse, its past intellectual successes a part of what has made our current problems possible in the first place.

This discovery – or apparent discovery – that academia as at present constituted is an intellectual and humanitarian disaster, there being an urgent need for an aca-

democratic revolution if humanity is going to be able to resolve the grave global problems that threaten its future, led me to publish two books on the subject: *What's Wrong with Science?* (1976), and *From Knowledge to Wisdom* (1984).

[Adapted from the Preface of N. Maxwell, *The Metaphysics of Science and Aim-Oriented Empiricism*, Springer, January 2019.]

<https://philpeople.org/profiles/nicholas-maxwell>

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- , 1998, *The Comprehensibility of the Universe*, Oxford University Press, Oxford.
- , 2004, *Is Science Neurotic?*, Imperial College Press, London.
- , 2012, Arguing for Wisdom in the University: An Intellectual Autobiography, *Philosophia*, 40 (4) pp. 663-704.

———, 2014, *How Universities Can Help Create a Wiser World: The Urgent Need for an Academic Revolution*, Imprint Academic, Exeter.

———, 2017a, *Understanding Scientific Progress*, Paragon House, Saint Paul, Minnesota.

———, 2017b, *In Praise of Natural Philosophy: A Revolution for Thought and Life*, McGill-Queen's University Press, Montreal.

———, 2017c, *Karl Popper, Science and Enlightenment*, UCL Press, London (free to download from [here](#)).

Invitation to Submit Opinion Piece

In order to make better educational use of the wide geographical and disciplinary reach of this HPS&ST Note, invitations are extended for readers to contribute opinion or position pieces or suggestions about any aspect of the past, present or future of HPS&ST studies.

Contributions can be sent direct to editor. Ideally, they might be pieces that are already on the web, in which case a few paragraphs introduction, with link to web site can be sent, or else the pieces will be put on the web with a link given in the Note.

They will be archived in the OPINION folder at the HPS&ST web site:

<http://www.hpsst.com/>.

Previous HPS&ST Note Opinion Pieces at <http://www.hpsst.com/>

Lucie Laplane, Paolo Mantovani, Ralph Adolphs, Hasok Chang, Alberto Mantovani, Margaret McFall-Ngai, Carlo Rovelli, Elliott Sober, and Thomas Pradeu: [Why Science Needs Philosophy](#) (April 2019)

Thomas J.J. McCloughlin, School of STEM Education, Innovation & Global Studies, Dublin City University, Ireland, [Beware the Greeks: Sources for the History of Gravity in Science Teaching](#) (March 2019)

Bettina Bussmann, University of Salzburg, Austria & Mario Kötter, University of Muenster, Germany [Between Scientism and Relativism: Epistemic Competence as an Important Aim in Science and Philosophy Education](#) (February 2019)

Robin Attfield, Philosophy Department, Cardiff University, [Climate Change and Philosophy](#) (January 2019)

Dhyaneswaran Palanichamy & Bruce V. Lewenstein, School of Integrative Plant Science, Cornell University, [How History can Enable Better Teaching of Statistics in Introductory Biology Courses](#) (December 2018)

Frederick Grinnell, Biology Department, University of Texas, [Teaching research integrity – Using history and philosophy of science to introduce ideas about the ambiguity of research practice](#) (November 2018)

New York Times, [Creeping Bias in Research: Negative Results Are Glossed Over](#) (October 2018)

Michael Matthews, School of Education, UNSW, [An Occasion to Celebrate: Mario Bunge's 99th Birthday](#) (September 2018)

Cormac Ó Raifeartaigh, Waterford Institute of Technology, Ireland, [History of Science in Schools](#) (July 2018)

Hugh Lacey, Philosophy Department, Swarthmore College, [Appropriate Roles for Ethics and Social Values in Scientific Activity](#) (June 2018)

Gerald Holton, Physics Department, Harvard University, [Tracing Tom Kuhn's Evolution: A Personal Perspective](#) (April/May 2018)

Monica H. Green, History Department, Arizona State University, [On Learning How to Teach the Black Death](#) (March 2018).

Stephen Pinker, Psychology Department, Harvard University, [The Intellectual War on Science](#) (February 2018).

Michael Ruse, Philosophy Department, Florida State University, [Does Life Have Meaning? Or is it Self-Deception at Best and Terrifyingly Absurd at Worst?](#) (January 2018).

Mario Bunge, Philosophy Department, McGill University, [In Defence of Scientism](#) (December 2017).

Susan Haack, Philosophy and Law Departments, University of Miami, [The Future of Philosophy, the Seduction of Scientism](#) (November 2017).

Nicholas Maxwell, University College London, [What's Wrong with HPS and What Needs be Done to Put it Right?](#) (June 2017).

Heinz W. Drodste, [An Interview with Mario Bunge](#) (May 2017).

Nicholas Maxwell, University College London, [The Crisis of Our Times and What to do About It](#) (April 2017).

Eric Scerri, UCLA, [Bringing Science Down to Earth](#) (March 2017).

Robert Nola, University of Auckland, [Fake News in the Post-Truth World](#), (February 2017).

Michael D. Higgins, President of Ireland, [The Need to Teach Philosophy in Schools](#) (December 2016).

Philip A. Sullivan, University of Toronto, [What is wrong with Mathematics Teaching in Ontario?](#) (July 2016).

Gregory Radick, Leeds University, [How Mendel's legacy holds back the teaching of science](#) (June 2016).

Matthew Stanley, New York University, [Why Should Physicists Study History?](#)

PhD Theses in HPS&ST Domain: Gerda Maisa Jensen, University of São Paulo

Name: Gerda Maisa Jensen

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Institution: Institute of Biosciences of the University of São Paulo, Brazil.

Supervisor: Maria Elice Bzerzinski Prestes

E-mail address: eprestes@ib.usp.br

Title: “Charles Darwin (1809-1882) and electric fishes: history and nature of science in science education of Youth and Adults.” (2016)

Abstract: This thesis was designed to introduce Science History episodes in elementary school science classes, mainly in Youth and Adult Education. It had two objectives in science teaching: promoting understanding of current scientific concepts related to the evolutionary theory of living beings and develop a perception on the characteristics of science and scientific inquiry.

The first part of the thesis was the historical research. The focus was to know the main explanations for the phenomenon of numbness and pain caused by different kinds of fish in xvii and xviii centuries. The fish’s phenomenon was first considered in a corpuscular and mechanical level, and then in an electric one. This explanation was taken in the nineteenth century, in the context of evolutionary theory. The electric organs of fish belonging to different taxonomic groups were considered by Charles Robert Darwin (1809-1882) as a special difficulty for the principle of natural selection.

This study indicated the approach adopted by English naturalist and compared it to the current scientific knowledge since this original historical study was devoted to the learning of a set of concepts related to the natural selection principle. The historical study followed the methodology research in history of science, through

analysis of primary sources, in the light of secondary sources.

The second part was planning, validation, implementation and evaluation of a Teaching Learning Sequence (TLS). The empirical research has been done according to the action-research in a public school of São Paulo city, Brazil. The triangulation of data was made from photographs, audiovisual recordings of classes, semi-structured interviews, and the teacher-researcher notes. The results were the increasing in the number of students with more informed perceptions about science and understanding the principle of natural selection to explain the origin of species - a current scientific content, considered complex and far from students' daily lives.

More information available [here](#).

The HPS&ST Note is the ideal medium for publicizing and making known submitted and awarded doctoral theses in the HPS&ST domain.

The following details should be submitted to the editor at m.matthews@unsw.edu.au:

- Candidate's Name and email
- Institution
- Supervisor
- Thesis title
- Abstract of 100-300 words
- Web link when theses are required to be submitted for Open search on web.

Recent HPS&ST Research Articles

Akerson, V.L., Carter, I., Pongsanon, K. et al. (2019) Teaching and Learning Nature of Science in Elementary Classrooms: Research-Based Strategies for Practical

- Implementation. *Science & Education*, 1-21. doi:[10.1007/s11191-019-00045-1](https://doi.org/10.1007/s11191-019-00045-1) online first
- Babic, B. (2019) A Theory of Epistemic Risk. *Philosophy of Science*, 1-51. doi:[10.1086/703552](https://doi.org/10.1086/703552) (Just Accepted)
- Baldassarri, F. (2019) The mechanical life of plants: Descartes on botany. *The British Journal for the History of Science*, 52(1), 41-63
- Chalozin-Dovrat, L. (2019) The History of SPACE Between Science and Ordinary Language: What Can Words Tell Us About Conceptual Change? *Perspectives on Science*, 27(2), 244-277. doi:[10.1162/posc_a_00307](https://doi.org/10.1162/posc_a_00307)
- Currie, A., & Walsh, K. (2019) Frameworks for Historians and Philosophers. *HOPPOS: The Journal of the International Society for the History of Philosophy of Science* 9(1), 1-34. doi:[10.1086/699797](https://doi.org/10.1086/699797)
- Develaki, M. (2019) Methodology and Epistemology of Computer Simulations and Implications for Science Education. *Journal of Science Education and Technology*, 1-18. doi:[10.1007/s10956-019-09772-0](https://doi.org/10.1007/s10956-019-09772-0) online first
- Galili, I. (2019) Towards a Refined Depiction of Nature of Science: Applications to Physics Education. *Science & Education*, 1-35. doi:[10.1007/s11191-019-00042-4](https://doi.org/10.1007/s11191-019-00042-4)
- Hansson, L., Arvidsson, A, Heering, P., & Pendrill, A-M. (2019) Rutherford visits middle school: a case study on how teachers direct attention to the nature of science through a storytelling approach. *Physics Education*, 54(4), 1-12.
- Kahn, S. & Zeidler, D.L. (2019) A Conceptual Analysis of Perspective Taking in Support of Socioscientific Reasoning. *Science & Education*, 1-34. doi:[10.1007/s11191-019-00044-2](https://doi.org/10.1007/s11191-019-00044-2) online first
- Pushcharovsky, D. (2019) Dmitry I. Mendeleev and his time. *Substantia*, 3(1), 119-129 doi:[10.13128](https://doi.org/10.13128)

Stack, D. (2019) Charles Darwin and the scientific mind. *The British Journal for the History of Science*, 52(1), 85-115.

Summers, R. et al. (2019) Representations of nature of science in U.S. science standards: A historical account with contemporary implications. *Journal of Research in Science Teaching*, 1-35. doi:[10.1002/tea.21551](https://doi.org/10.1002/tea.21551) on line first

van Strien, M. (2019) Pluralism and anarchism in quantum physics: Paul Feyerabend's writings on quantum physics in relation to his general philosophy of science. *Studies in History and Philosophy of Science Part A*, 1-10. doi:[10.1016/j.shpsa.2019.03.006](https://doi.org/10.1016/j.shpsa.2019.03.006) online first

Recent HPS&ST Related Books

Friedman, Batya and Hendry, David G. (2019) *Value Sensitive Design: Shaping Technology with Moral Imagination*. Cambridge, MA: MIT University Press. ISBN: 9780262039536

“Implantable medical devices and human dignity. Private and secure access to information. Engineering projects that transform the Earth. Multigenerational information systems for international justice. How should designers, engineers, architects, policy makers, and others design such technology? Who should be involved and what values are implicated? In *Value Sensitive Design*, Batya Friedman and David Hendry describe how both moral and technical imagination can be brought to bear on the design of technology. With value sensitive design, under development for more than two decades, Friedman and Hendry bring together theory, methods, and applications for a design process that engages human values at every stage.

“After presenting the theoretical foundations of value sensitive design, which lead to a deep rethinking of technical design, Friedman and Hendry explain seventeen methods, including stakeholder analysis, value scenarios, and multilifespan timelines. “Following this, experts

from ten application domains report on value sensitive design practice. Finally, Friedman and Hendry explore such open questions as the need for deeper investigation of indirect stakeholders and further method development.

“This definitive account of the state of the art in value sensitive design is an essential resource for designers and researchers working in academia and industry, students in design and computer science, and anyone working at the intersection of technology and society.” (From the Publisher)

More information available [here](#).

Herring, Emily, Jones, Kevin, Kiprijanov, Konstantin, & Sellers Laura M. (Eds.) (2019) *The Past, Present, and Future of Integrated History and Philosophy of Science*. London, UK: Routledge.

“Integrated History and Philosophy of Science (IHPS) is commonly understood as the study of science from a combined historical and philosophical perspective. Yet, since its gradual formation as a research field, the question of how to suitably integrate both perspectives remains open. This volume presents cutting edge research from junior IHPS scholars, and in doing so provides a snapshot of current developments within the field, explores the connection between IHPS and other academic disciplines, and demonstrates some of the topics that are attracting the attention of scholars who will help define the future of IHPS.” (From the Publisher)

More information available [here](#).

Iliffe, Rob (2019) *Priest of Nature: the Religious Worlds of Isaac Newton*. Oxford, UK: Oxford University Press. ISBN: 9780190931599

“He was the dominant intellectual figure of his age. His published works, including the *Principia Mathematica* and *Opticks*, reached across the scientific spectrum, revealing the degree of his interdisciplinary genius. His renown opened doors throughout his career, securing him prestigious positions at Cambridge, the Royal Mint, and the Royal Society. Yet alongside his public success, Sir Isaac Newton harbored private religious convictions that set him at odds with established law and Anglican doctrine, and, if revealed, threatened not just his livelihood but his life.

“(…) In *Priest of Nature*, historian Rob Iliffe introduces readers to Newton the religious animal, deepening our understanding of the relationship between faith and science at a formative moment in history and thought. Previous scholars and biographers have generally underestimated the range and complexity of Newton’s religious writings, but Iliffe shows how wide-ranging his observations and interests were, spanning the entirety of Christian history from Creation to the Apocalypse. Iliffe’s book allows readers to fully engage in the theological discussion that dominated Newton’s age. A vibrant biography of one of history’s towering scientific figures, *Priest of Nature* is the definitive work on the spiritual views of the man who fundamentally changed how we look at the universe.” (From the Publisher)

More information available [here](#).

McIntyre, Lee (2019) *The Scientific Attitude: Defending Science from Denial, Fraud, and Pseudoscience*. Cambridge, MA: MIT University Press. ISBN: 9780262039833

“Attacks on science have become commonplace. Claims that climate change isn’t settled science, that evolution is “only a theory,” and that scientists are conspiring to keep the truth about vaccines from the public are staples of some politicians’ rhetorical repertoire. Defenders of science often point to its discoveries (penicillin! relativity!) without

explaining exactly why scientific claims are superior. In this book, Lee McIntyre argues that what distinguishes science from its rivals is what he calls “the scientific attitude”—caring about evidence and being willing to change theories on the basis of new evidence. The history of science is littered with theories that were scientific but turned out to be wrong; the scientific attitude reveals why even a failed theory can help us to understand what is special about science.

“McIntyre offers examples that illustrate both scientific success (a reduction in childbed fever in the nineteenth century) and failure (the flawed “discovery” of cold fusion in the twentieth century). He describes the transformation of medicine from a practice based largely on hunches into a science based on evidence; considers scientific fraud; examines the positions of ideology-driven denialists, pseudoscientists, and “skeptics” who reject scientific findings; and argues that social science, no less than natural science, should embrace the scientific attitude. McIntyre argues that the scientific attitude—the grounding of science in evidence—offers a uniquely powerful tool in the defense of science.” (From the Publishers)

More information available [here](#).

Marra, John F. (2019) *Hot Carbon: Carbon-14 and a Revolution in Science*. New York, NY: Columbia University Press. ISBN: 9780231186704

“This is an engaging and witty account of the discovery of carbon-14 – there are surprising twists and turns along the way. With its entertaining descriptions of carbon-14’s role in understanding fundamental life processes, dating archaeological specimens, and chronicling past climate, this book is a page-turner for anyone interested in the history of scientific discovery.” – James J. McCarthy, Alexander Agassiz Professor of Biological Oceanography, Harvard University

“The more times I read this book, the more favorably impressed I am with the clarity and drama of the narrative. Marra’s work will be very well received and appreciated by those interested in how science advances. This is true particularly now, when there is so much controversy surrounding the validity of science *per se*.” – Richard T. Barber, Harvey W. Smith Professor Emeritus of Biological Oceanography in the Division of Earth and Ocean Sciences, Duke University

More information available [here](#).

McCain, Kevin & Kampourakis, Kostas (Eds.) (2019) *What is Scientific Knowledge? An Introduction to Contemporary Epistemology of Science*. London, UK: Routledge ISBN: 9781138570153

“*What is Scientific Knowledge?* is a much-needed collection of introductory-level chapters on the epistemology of science. Renowned historians, philosophers, science educators, and cognitive scientists have authored 19 original contributions specifically for this volume. The chapters, accessible for students in both philosophy and the sciences, serve as helpful introductions to the primary debates surrounding scientific knowledge. First-year undergraduates can readily understand the variety of discussions in the volume, and yet advanced students and scholars will encounter chapters rich enough to engage their many interests. The variety and coverage in this volume make it the perfect choice for the primary text in courses on scientific knowledge. It can also be used as a supplemental book in classes in epistemology, philosophy of science, and other, related areas.” (From the Publishers)

More information available [here](#).

Milo, Daniel S. (2019) *Good Enough: The Tolerance for Mediocrity in Nature and Society*. Cambridge, MA: Harvard University Press. ISBN 9780674504622

“Why is the genome of a salamander forty times larger than that of a human? Why does the avocado tree produce a million flowers and only a hundred fruits? Why, in short, is there so much waste in nature? In this lively and wide-ranging meditation on the curious accidents and unexpected detours on the path of life, Daniel Milo argues that we ask these questions because we’ve embraced a faulty conception of how evolution—and human society—really works.

“*Good Enough* offers a vigorous critique of the quasi-monopoly that Darwin’s concept of natural selection has on our idea of the natural world. Darwinism excels in accounting for the evolution of traits, but it does not explain their excess in size and number. Many traits far exceed the optimal configuration to do the job, and yet the maintenance of this extra baggage does not prevent species from thriving for millions of years. Milo aims to give the messy side of nature its due—to stand up for the wasteful and inefficient organisms that nevertheless survive and multiply.

“But he does not stop at the border between evolutionary theory and its social consequences. He argues provocatively that the theory of evolution through natural selection has acquired the trappings of an ethical system. Optimization, competitiveness, and innovation have become the watchwords of Western societies, yet their role in human lives—as in the rest of nature—is dangerously overrated. Imperfection is not just good enough: it may at times be essential to survival.” (From the Publishers)

More information available [here](#).

Mertens, Rebecca (2019) *The Construction of Analogy-Based Research Programs: The Lock-and-Key Analogy in 20th Century Biochemistry*. New York, NY: Columbia University Press. ISBN: 9783837644425

“When the German chemist Emil Fischer presented his key-lock hy-

pothesis in 1899, his analogy to describe the molecular relationship between enzymes and substrates quickly gained vast influence and provided future generations of scientists with a tool to investigate the relation between chemical structure and biological specificity. Rebecca Mertens explains the appeal of the lock-and-key analogy by its role in model building and in the construction of long-term, cross-generational research programs. She argues that a crucial feature of these research programs, namely ascertaining the continuity of core ideas and concepts, is provided by a certain way of analogy-based modeling.” (From the Publisher)

More information available [here](#).

Rudolph, John L. (2019) *How We Teach Science: What's Changed, and Why It Matters*. Cambridge, MA: Harvard University Press. ISBN 9780674919341

“Scientific research has changed a great deal over the past century, but the ways that students have learned about science have changed even more dramatically. In this engaging and wide-ranging study, historian John Rudolph traces enormous pedagogical shifts, the aspirations behind them, and why they matter for scientists and citizens today.”

– David Kaiser, Massachusetts Institute of Technology

“Why should we teach science? And how should we teach it? John Rudolph provides our first thorough history of the many ways that American educators have imagined—and instructed—science over the past century. At a moment when ‘STEM’ fields have become almost a fetish in American culture and education, I hope we can pause long enough to ask ourselves why. Nobody will be able to frame a good answer without first consulting this masterful book.”

– Jonathan Zimmerman, University of Pennsylvania

“*How We Teach Science* is a provocative interrogation into the teaching of the scientific method. Weaving a tapestry of influences on policy

and practice, John Rudolph delivers an insightful historical examination of the oscillating institutional goals for science education, highlighting social tensions surrounding teaching the natural sciences during the twentieth century.” – Richard Duschl, Southern Methodist University

More information available [here](#).

Segre, Michael (2019) *Higher Education and the Growth of Knowledge: A Historical Outline of Aims and Tensions*. London, UK: Routledge. ISBN: 9780815381426

“This book sketches the history of higher education, in parallel with the development of science. Its goal is to draw attention to the historical tensions between the aims of higher education and those of science, in the hope of contributing to improving the contemporary university. A helpful tool in analyzing these intellectual and social tensions is Karl Popper’s philosophy of science demarcating science and its social context. Popper defines a society that encourages criticism as “open,” and argues convincingly that an open society is the most appropriate one for the growth of science. A “closed society,” on the other hand, is a tribal and dogmatic society. Despite being the universal home of science today, the university, as an institution that is thousands of years old, carries traces of different past cultural, social, and educational traditions. The book argues that, by and large, the university was, and still is, a closed society and does not serve the best interests of the development of science and of students’ education.”
(From the Publisher)

More information available [here](#).

Strasser, Bruno J. (2019) *Collecting Experiments: Making Big Data Biology*. Chicago, IL: The University of Chicago Press. ISBN: 9780226634999

“Databases have revolutionized nearly every aspect of our lives. Information of all sorts is being collected on a massive scale, from Google to Facebook and well beyond. But as the amount of information in databases explodes, we are forced to reassess our ideas about what knowledge is, how it is produced, to whom it belongs, and who can be credited for producing it.

“Every scientist working today draws on databases to produce scientific knowledge. Databases have become more common than microscopes, voltmeters, and test tubes, and the increasing amount of data has led to major changes in research practices and profound reflections on the proper professional roles of data producers, collectors, curators, and analysts.

“Collecting Experiments traces the development and use of data collections, especially in the experimental life sciences, from the early twentieth century to the present. It shows that the current revolution is best understood as the coming together of two older ways of knowing—collecting and experimenting, the museum and the laboratory. Ultimately, Bruno J. Strasser argues that by serving as knowledge repositories, as well as indispensable tools for producing new knowledge, these databases function as digital museums for the twenty-first century.” (From the Publishers)

More information available [here](#).

Sykes, Lynn R. (2019) *Plate Tectonics and Great Earthquakes: 50 Years of Earth-Shaking Events*. New York, NY: Columbia University Press. ISBN: 9780231186889

“Lynn Sykes, one of the scientific revolutionaries who gave us plate tectonics, tells his story, with special emphasis on earthquake prediction. Although earthquake prediction has been a topic perceived by some as pursued only by “fools and charlatans,” Sykes defends it not

only as worthy of pursuit but also, however imperfect, as likely to be societally valuable.” – Peter Molnar, Distinguished Professor of Geological Sciences, University of Colorado, Boulder

“Lynn R. Sykes is world-renowned for his contributions to seismology. In this retrospective, he reflects on his fruitful scientific journey, from reading lots of seismograms and making fundamental contributions to the theory of plate tectonics and the understanding of great earthquakes, to the public policy implications of his earthquake research.” – Martin Reyners, GNS Science, New Zealand

“The theory of plate tectonics transformed earth science. The hypothesis that the earth’s outermost layers consist of mostly rigid plates that move over an inner surface helped describe the growth of new seafloor, confirm continental drift, and explain why earthquakes and volcanoes occur in some places and not others. Lynn R. Sykes played a key role in the birth of plate tectonics, conducting revelatory research on earthquakes. In this book, he gives an invaluable insider’s perspective on the theory’s development and its implications.

“Sykes combines lucid explanation of how plate tectonics revolutionized geology with unparalleled personal reflections. He entered the field when it was on the cusp of radical discoveries. Studying the distribution and mechanisms of earthquakes, Sykes pioneered the identification of seismic gaps—regions that have not ruptured in great earthquakes for a long time—and methods to estimate the possibility of quake recurrence. He recounts the various phases of his career, including his antinuclear activism, and the stories of colleagues around the world who took part in changing the paradigm. Sykes delves into the controversies over earthquake prediction and their importance, especially in the wake of the giant 2011 Japanese earthquake and the accompanying Fukushima disaster. He highlights geology’s lessons for nuclear safety, explaining why historic earthquake patterns are crucial to understanding the risks to power plants. *Plate Tectonics and Great Earthquakes* is the story of a scientist witnessing a revolution and play-

ing an essential role in making it.” (From the Publisher)

More information available [here](#).

van der Kruit, Pieter C. (2019) *Jan Hendrik Oort: Master of the Galactic System*. Dordrecht: Springer

“This book is the first thorough and overdue biography of one of the giants of science in the twentieth century, Jan Hendrik Oort. His fundamental contributions had a lasting effect on the development of our insight and a profound influence on the international organization and cooperation in his area of science and on the efforts and contribution of his native country.

“This book aims at describing Oort’s life and works in the context of the development of his branch of science and as a tribute to a great scientist in a broader sense. The astronomer Jan Hendrik Oort from the Netherlands was founder of studies of the structure and dynamics of the Milky Way Galaxy, initiator of radioastronomy and the European Southern Observatory, and an important contributor to many areas of astronomy, from the study of comets to the universe on the largest scales.” (From the publisher)

More information available [here](#).

Yates, JoAnne and Murphy, Craig N. (2019) *Engineering Rules: Global Standard Setting since 1880*. Baltimore, MD: Johns Hopkins University Press. ISBN: 9781421428895

“A deeply researched and well-crafted examination of one of the key invisible infrastructures of the modern world: private consensus-based industrial standards. Aptly combining their respective expertise, the

authors have written an impressive and highly detailed treatment of the emergence of standards-setting bodies, their networks, and their legion of activities. Standards geeks, of which there are thousands, will want to read this book—the first volume of its kind.” – Thomas J. Misa, University of Minnesota, coauthor of *FastLane: Managing Science in the Internet World*

”From trains to planes to household electric plugs, unseen committees of engineers have been making our technologies work together for decades. This fascinating book explains how they’ve done it and offers compelling lessons to historians, technologists, and policy makers alike. Highly recommended.” – Fred Turner, Stanford University, author of *The Democratic Surround: Multimedia and American Liberalism from World War II to the Psychedelic Sixties*

”Drawing on interviews, personal correspondence, and other unconventional sources, Yates and Murphy make a compelling case that voluntary private standardizers were motivated by non-economic forces. A critical contribution to our deliberation about whether this vital activity of consensual decision-making that elevated the profession in the twentieth century will survive in the next.” – Margaret B. W. Graham, McGill University, coauthor of *Corning and the Craft of Innovation*

More information available [here](#).

Authors of HPS&ST-related papers and books are invited to bring them to attention of the Note’s assistant editors, Paulo Maurício at paulo.asterix@gmail.com or Nathan Oseroff-Spicer at nathanoserooff@gmail.com for inclusion in these sections.

Coming HPS&ST Related Conferences

May 27-29, 2019, Eddington Conference, Paris, France.

Details at: <https://www.eddingtonstudies.org/>.

May 29-31, 2019, Plastics Heritage: History, Limits and Possibilities. Museu da Farmácia (Pharmacy Museum) in Lisbon, Portugal

Details available [here](#).

July 7-12, 2019, International Society for the History, Philosophy and Social Studies of Biology meeting (ISHPSSB), Oslo, Norway.

Abstracts deadline: 18 January 2019

Details available [here](#).

July 10-13, 2019, British Society for the History of Science meeting, Edinburgh, UK.

Details at: <http://www.bshs.org.uk>.

July 15-19, 2019, International History, Philosophy and Science Teaching Group, Biennial Conference, Thessaloniki, Greece.

Details from conference chair, Fanny Seroglou, fannyseroglou@gmail.com.

July 22-26, 2019, The 46th Annual Hume Society Conference, University of Nevada, Reno, NV, USA.

Details available [here](#).

July 25-27, 2019, Learning From Empirical Approaches to HPS 2019 (LEAHPS 2019), Leibniz University, Hannover, Germany

Details at: <https://leaphs2019.wordpress.com/>.

July 22-26, 2019, The 46th Annual Hume Society Conference, University of Nevada, Reno, NV, USA.

Details available [here](#).

July 26-28, 2019, 4th International Periodic Table Conference: 'Mendeleev 150',

ITMO University, St Petersburg, Russia

Details available [here](#).

July 28 – August 3, 2019, ‘Structuring Nature. An Interdisciplinary and Intercultural Summer School’, Humboldt Universität zu Berlin, Institut für Philosophie
Details available [here](#).

August 5-10, 2019, 16th Congress of Logic, Methodology and Philosophy of Science and Technology (CLMPST), Prague, Czech Republic.

For updates and details see [here](#).

August 27-30, 2019, 12th International Whitehead Conference, University of Brasilia, Brazil.

Details at: <https://www.whitehead2019.org/>.

September 2-4, 2019. European Conference for Cognitive Science (EuroCogSci 2019), Ruhr-Universität Bochum, Germany.

More information: EuroCogSci2019@rub.de.

September 19-21, 2019, Experimental Philosophy Conference, University of Bern, Switzerland.

More information available [here](#).

October 29-30, 2019, ‘Scientific Literacy for All’ Conference, Beijing Normal University, China.

More information available [here](#).

Email: bnukxts@126.com.

October 30 – November 1, 2019, Bucharest Colloquium in Early Modern Science, University of Bucharest.

Details: Ovidiu Babeş (ovidiu.babes@icub.unibuc.ro).

November 5-7, 2019, ‘Values in Modelling and Decision Analyses’, Society for Decision Making under Deep Uncertainty (DMDU), Delft University of Technology

Information available [here](#).

December 7-11, 2019, Philosophy of Education Society of Australasia (PESA) Annual Conference, University of Hong Kong.

More information: <https://pesa.org.au/conference>.

January 3-6, 2020, episteme 8, conference, Mumbai, India

Details available [here](#).

March 15-18, 2020, NARST Annual Conference, Portland OR, USA

More information available [here](#).