



HPS&ST

NEWSLETTER

HPS&ST NEWSLETTER

NOVEMBER 2019

The HPS&ST NEWSLETTER has been published for about 30 years in print or electronic form. It began during the editor's 25-year period (1990-2014) as editor of Springer's *Science & Education: Contributions from History and Philosophy of Science* journal and his term as president of the International History, Philosophy and Science Teaching Group and later as president of the Inter-Divisional Teaching Commission of the DLMPST & the DHST.

The NEWSLETTER 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.

The contents page of the HPS&ST NEWSLETTER is emailed monthly to about 8,400 individuals who directly or indirectly have an interest in the contribution of history and philosophy of science to theoretical, curricular and pedagogical issues in science teaching and teacher education; and/or interests in the promotion of innovative, engaging and effective teaching of the history and philo-

sophy of science.

Contributions to the NEWSLETTER (publications, conferences, opinion pieces, &c.) are welcome and should be sent direct to the editor: Michael R. Matthews, UNSW (m.matthews@unsw.edu.au).

The NEWSLETTER, along with RESOURCES, OBITUARIES, OPINION PIECES and more, are available at the website: <http://www.hpsst.com/>

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Appointment of NEWSLETTER Assistant Editor, Stanislav Južnič

Stanislav Južnič has been appointed the third assistant editor of the HPS&ST NEWSLETTER. He joins Paulo Maurício (Education, Lisbon, paulo.asterix@gmail.com) and Nathan Oseroff-Spicer (Philosophy, London, nathanoseroff@gmail.com).

Stanislav is co-editor of the *Journal of Croatian Academy of Sciences and Arts*. He was born in San Francisco and obtained USA and Slovenian citizenship. That makes him equally at home on both sides of the Atlantic Ocean. He finished elementary school in Beograd. During his studies, he worked at the University of Minsk in Russia.



He graduated in the Physics department of the University at Ljubljana with Robert Blinc with a work widely published in USA and Europe as the very first accurate measurement special solid-state phase transitions with liquid crystals involved.

Email: juznic@hotmail.com.

He studied history of 18th century physics with academician Vasilij Melik at the department of history of the University of Ljubljana, got Masters' and Ph.D. in the same University. After Ph.D., he returned to his USA home where he worked in the Film Library of the Jesuit University Saint Louis, MO, and at the Science Department University of Oklahoma, researching simultaneously also at the Institute for Mathematics, Physics, and Mechanics at Ljubljana, and at the Scientific Research Centre of Slovenian Academy of Sciences and Arts.

He has published about one thousand research works (articles, books) in Chinese, and almost all European languages in China, Japan, USA, Australia, Russia and many European Countries most of which are available on web. He is fluent in almost all European languages. His contemporary research connected with Rudjer Bošković and Nikola Tesla Networks showing how Tesla's electronics emerged from the ideas of his Jesuit teachers. For decades, Stanislav collaborated with the European Jesuits trying to put in the limelight the achievements of the Ljubljana Jesuit physicists. Among his recent monographs are *Hallerstein, a Chinese Astronomer from Mengeš* (2003, English translations 2014, Chinese translations 2015 and 2016), *History of the Vacuum Research and Vacuum Techniques* (October 2004, 2009, 2016: trilogy), *History of Kostel: 1500-1900: between two civilizations* (Camp Hill (Pennsylvania): SGSI, 2005, translated in 2008), *Gabriel Gruber: from Ljubljanian Canal to Jesuit General* (May 2006), *Professor Plemelj and Comet* (2006), *Fran Dominko and Slovenian Astronomy* (2007), *Blaž Kocen and the Beginning of Geography Teaching at Carniola* (2007), *Valvasor at Slovene Astronomy* (2007).

For the international astronomical year 2009 he finished his trilogy about the history of exact sciences in Slovenia which includes *Astronomy* (Radovljica: Didakta, 2008), *Physics* (2008), and *Mathematics* (2009). He prepared the history of Franciscan physics and related sciences for the 800th anniversary of Franciscan order in 2009 and a three volume series, *History of Vacuum and Vacuum Techniques* in 2004, 2010 and 2016, published by the Vacuum Society.



The Linda Hall Library is pleased to offer three types of fellowships this year:

Linda Hall Library 2020 Fellowships

The Linda Hall Library Kansas City is now accepting applications for its 2020-21 fellowship program. These fellowships provide graduate students, postdoctoral researchers, and independent scholars with financial support to make use of the Linda Hall Library's outstanding science and engineering collections.

The Linda Hall Library holds over half a million monograph volumes and more than 48,000 journal titles documenting the history of science and technology from the 15th century to the present. Its collections are exceptionally strong in the engineering disciplines, chemistry, and physics. The Library also boasts extensive resources related to natural history, astronomy, environmental and earth sciences, aeronautics, life sciences, infrastructure studies, mathematics, and the history of the book.

- Travel fellowships, lasting between one and three weeks, support brief, exploratory visits to the Linda Hall Library. Funding is available for up to \$750 per week to defray the costs of travel and living in Kansas City.
- Residential fellowships, lasting between one and four months, support scholars conducting more extensive research using the Library's collections. Fellowship funding is offered up to \$3,000 per month for doctoral students and up to \$4,200 per month for postdoctoral scholars.
- A new History of Science and Medicine fellowship, sponsored by the Linda Hall Library and the Clendening History of Medicine Library at the University of Kansas Medical Center, will provide a doctoral student with a \$3,000 stipend to conduct research in both libraries' collections for one month.

All Linda Hall Library research fellows participate in a vibrant intellectual community alongside scholars from nearby libraries and universities, including the University of Missouri-Kansas City, the University of Kansas, and the Clendening History of Medicine Library. Fellows may also attend the Library's many lectures and public programs.

I encourage you to share this information with graduate students, colleagues, or anyone else who might be interested in the Linda Hall Library's fellowship program. All application materials are due no later than January 17, 2020. For further information, please visit [here](#) or e-mail fellowships@lindahall.org.

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**Society for Philosophy of Science
 in Practice (SPSP) Eighth Biennial
 Conference, Michigan State University,
 USA, 7-10 July 2020**

In collaboration with the Consortium for Socially Relevant Philosophy of/in Science and Engineering (SRPOISE) biennial meeting (see details below).

Keynote speakers: Karen Barad, University of California at Santa Cruz; Till Grüne-Yanoff, Royal Institute of Technology (KTH) Stockholm

Keynote MSU panel on "Epistemologies of Science": Kristie Dotson (Philosophy and African American and African Studies); Sean A. Valles (Lyman Briggs College and Philosophy); Kyle Whyte (Philosophy and Community Sustainability)

Online submission site for paper or session proposals is [here](#).

Abstract submission deadline: 10 January 2020

Main Contact: Alan C. Love, aclove@umn.edu

SPSP is an interdisciplinary community of scholars who approach the philosophy of science with a focus on scientific practice and the practical uses of scientific knowledge.

For further details on our objectives, see our mission statement [here](#).

SPSP welcomes both proposals for individual papers, and also strongly encourage proposals for whole, thematic sessions with coordinated papers, particularly those which include multiple disciplinary perspectives and/or input from scientific practitioners. You may wish to involve other members of SPSP (a listing is available on our website) or post a notice to the SPSP mailing list describing your area of interest and seeking other possible participants for a session proposal. (To post to this list or to receive updates on the conference, please subscribe via [this link](#)).

Alan C. Love
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Journal Special Issue: "Idealization, Representation, Explanation Across the Sciences", *Studies in History and Philosophy of Science*

Call for Papers: "Idealization, Representation, Explanation Across the Sciences"
 Special Issues: *Studies in History and Philosophy of*

Science Part A

Guest editors: Elay Shech, Melissa Jacquart, Martin Zach

Information available [here](#).

One goal of the scientific endeavour is to explain phenomena. Often, scientists attempt to explain a phenomenon by way of representing it in some manner (such as with mathematics, models, or theory), which allows for an explanation of the phenomenon under investigation. However, in developing scientific representations, scientists often deploy simplifications and idealisations. As a result, scientific representations often provide only partial, and often distorted, accounts of the phenomenon in question. Philosophers have analysed the nature and function of how scientists construct representations, deploy idealisations, and provide explanations.

While the topics of idealisation, representation, and explanation have been thoroughly discussed in the literature separately, they deserve further analysis in terms of the connections among themselves, across different scientific disciplines, and in relation to other central issues in philosophy of science such as the realism debate and confirmation theory.

The focus of this special issue is to address, among others, the following topics:

- How can one account for the practice of employing assumptions that are strictly false but that nevertheless tell us something important about the world?
- Can idealisations facilitate or aid in developing representations or offering explanations of phenomena? If so, how? If not, why not?
- Is there always a conflict between idealisation and accurate representation?

- If explaining requires representing difference-makers responsible for the phenomenon in question, what happens if the difference-makers are misrepresented?
- Are there any important differences for the role of idealisation and representation in offering explanations in the context of modelling verses theory development?
- Do idealisations and misrepresentations afford understanding (in addition to or instead of providing explanations)?
- How are we to make sense of distinctively mathematical explanations of physical phenomenon that appear in science?
- Should mathematical explanations in science be thought of as inaccurate representations or do they latch on to the ostensible mathematical nature of the natural world?
- Assuming that there are indispensable idealisations in science, can realists make sense of such state of affairs? Or does the presence of such idealisation support empiricism?
- More generally, do our practices of scientific representation support realism or empiricism?

We invite original contributions that address any (but are not necessarily limited to) these questions. The deadline for submitting manuscripts is January 15, 2020.

Submissions must not be under consideration for publication elsewhere. Submissions must be prepared for anonymous review and should not exceed 10,000 words, including abstract, footnotes, and references. Manuscripts should be submitted online via the EVISE system, [here](#), by selecting the Idealization, Representation, Explanation Special

Issue (si) from the list. Manuscripts must be prepared according to the instructions for authors available [here](#).

Further questions should be addressed to guest editors:

Elay Shech (eshech@auburn.edu)

Melissa Jacquart (melissa.jacquart@uc.edu)

The Partington Prize 2020

The Society for the History of Alchemy and Chemistry established the Partington Prize in memory of Professor James Riddick Partington, the Society's first Chairman. It is awarded every three years for an original and unpublished essay on any aspect of the history of alchemy or chemistry. The prize consists of five hundred pounds (£500) if awarded to a single essay. Alternatively, it may be divided, or not awarded at all.

The competition is open to anyone with a scholarly interest in the history of alchemy or chemistry who, by the closing date of 31 December 2019, has not reached 35 years of age, or if older is currently enrolled in a degree programme or has been awarded a master's degree or PhD within the previous three years. No restriction is placed on the nationality or country of residence of competitors. Only one entry is permitted from any competitor.

The prize-winning essay will be published exclusively in the Society's journal, *Ambix*. It must not have been submitted to any other journal at any time before 30 April 2020.

Essays must be submitted in English. Essays must be fully documented using the conventions used in the current issue of *Ambix* and include an abstract of no more than 200 words. Essays must

not exceed 10,000 words in length, including the abstract, references and footnotes.

All entries should be sent to The Hon. Secretary at prizes@ambix.org in the form of two separate e-mail attachments in Microsoft Office Word (preferably 2013 or later). The first attachment should be headed "Partington Prize Entry 2020" and should give the author's name, institution, postal address, e-mail address, date of birth (and, if relevant, the date of the award of the masters degree or PhD), the title of the essay, and the word count. The second attachment should be the essay, which should not identify the author either by name or implicitly.

Entries must arrive before midnight GMT on 31 December 2019. The decision of the Society will be final on all matters. The result of the competition will be announced by 30 April 2020. Please direct any enquiries to prizes@ambix.org.

8th Integrated History and Philosophy of Science Conference (HPS&8), Virginia Tech, Blacksburg VA, July 15-17, 2020

The Committee for Integrated History and Philosophy of Science invites the submission of individual paper and poster abstracts for "&HPS8", the 8th conference in the series Integrated History and Philosophy of Science. We seek contributions that genuinely integrate the historical and philosophical analysis of science (i.e., the physical sciences, life sciences, cognitive sciences, and social sciences), or discuss methodological issues surrounding the prospects and challenges of integrating history and philosophy of science. For inform-

ation about Integrated History and Philosophy of Science and previous conferences, see [here](#).

Recent scholarship in history and especially in philosophy of science has shown that scientific practice can best be characterised as a pluralistic endeavour. Might the field of integrated history and philosophy of science (HPS) also need a pluralistic framework for the analysis of the full sweep of science in past and present, combining philosophical analysis and historical evaluation of science? How might we build disciplinary knowledge without disciplinary methodological unification? The organisers especially welcome contributions investigating problem-centred and pluralistic methodologies for integrated HPS. The organisers also welcome submissions in any area of integrated HPS.

Deadline for submission of paper and poster abstracts: December 10, 2019

Notification date: January 31, 2020

Please direct any inquiries to Lydia Patton (critique@vt.edu) or Jutta Schickore (jschicko@indiana.edu)

British Society for History of Science Annual Conference, Aberystwyth University, 8-11 July 2020

The [British Society for the History of Science](#) invites proposals for individual papers and organised symposia for its [2020 Annual Conference](#), which this year will be held in Aberystwyth, home of the National Library of Wales and Aberystwyth University, from Wednesday 8 July to Saturday 11 July.



Individual paper proposers should submit a title and abstract for a paper of 20-25 minutes to the conference's [Paper Proposal](#) site at Oxford Abstracts. If accepted, these papers will be arranged into themed sessions by the BSHS.

Symposium organisers should submit details of their proposed session to the conference's [Symposium Proposal](#) site at Oxford Abstracts.

A symposium may take the form of:

- an organised panel (three papers in 90 minutes, with (optionally) a predetermined chair)
- a roundtable (three or more discussants initiating a conversation with the audience)
- a workshop (one or more facilitators leading other delegates in an activity).

The deadline for receipt of paper and symposia proposals via the Oxford Abstracts system is Monday 6 January 2020. The BSHS will inform applicants of the outcome by Friday 14 February 2020.

For further information about the annual conference, please see the [BSHS Annual Conference 2020 Website](#).

Science, Religion and Big Questions Conference, University of Oxford, 22-23 June 2020

The Learning about Science and Religion (LASAR) Research Centre at Canterbury Christ Church University and the Oxford Argumentation in Religion and Science (OARS) project at the Department of Education at the University of Oxford invite abstracts for papers and seminars that explore Big Questions in the context of education and the science-religion dialogue.

Papers and seminars are invited which will help to characterise, expand and progress the science-religion dialogue in relation to Big Questions. This could be by discussing ways to relate science and religion in general or in the context of a selected Big Question, for example, how science and religion can help us understand what it means to be a person; mapping issues explored in the science-religion dialogue onto contemporary contexts such as the question of personhood in the context of artificial intelligence; or by identifying 'wicked problems' in contemporary life that can be examined through a framework of Big Questions, such as by examining the intersection of mental health and the science-religion dialogue.

Papers should introduce language and constructs that will help educators to understand the terrain. Terms could include epistemic insight, argumentation, theory of knowledge, knowledge domains, sufficient truth, conundrum, apparent contradiction, conflict, ways of relating, interdisciplinary relationships, cross-disciplinary questions, multidisciplinary arenas.

We hope that the conference will provide a compendium of Big Questions that can engage stu-

dents' and young adults' interest, with explanations for teachers and tutors about their educative value and the importance of giving students access to a range of views about how science and religion relate.

Abstract submissions are invited for either individual short papers (300-500 words) or seminar proposals (600-1000 words). For short papers, speaker(s) will have a maximum of 20 minutes presentation time, followed by up to 10 minutes for questions and discussion.

For seminars, authors are asked to propose three or four presentations that link together with a shared time for questions and discussion.

Please email abstracts as a Word document to Professor Berry Billingsley, lasar@canterbury.ac.uk by 1st February 2020. Abstracts will be considered on receipt.

Visit <http://www.epistemicinsight.com> for more information about the Epistemic Insight Initiative.

Objects of Understanding: Historical Perspectives on Material Artefacts and Practices in Science Education, Europa-Universität Flensburg (Germany), 29 June – 3 July 2020

We invite the submission of paper and poster abstracts for a five-day conference on the history of objects and practices in science education. Understanding the history of science education is essential if we want to understand the generation, reproduction and circulation of scientific know-

ledge, practices, practitioners, and objects.

While history of science education has moved from the periphery to the focus of history of science in recent decades, the central role of instruments, demonstrations and models in teaching has barely been explored. Particularly with respect to the analysis of scientists' formation in different periods, the role of objects and of practices in laboratories appears to be crucial. Moreover, with respect to the political and social function that was ascribed to science, the role and purpose of objects in school science education needs a more thorough reflection.

In this conference, we will discuss objects that were explicitly designed for the purpose of science education such as teaching demonstrations and students' experiments, models and collections of specimens. Moreover, we want to address the relationship between teaching and research instruments and collections, and the practices associated with them. We explicitly want to bring together objects and practices from the different contexts and periods of science teaching in schools and technical training institutes, the formation of future scientists at universities, and teaching a general audience about and through science.

Following the conference Learning by Doing hosted in 2009 at the University of Regensburg, we invite historians of science as well as scholars from neighbouring fields such as material culture studies, history of education and science museums to present their work on the historical development and role of objects that were intended to represent, present and transfer knowledge within the scientific disciplines.

We invite proposals for presentation of individual papers of 20 minutes as well as posters. Please submit an abstract of no more than 250 words to

OoU-conference@uni-flensburg.de. The deadline for submission of abstracts is 6 January 2020, notification about acceptance will be sent by 1 February 2020.

Organizers: Peter Heering, Europa-Universität Flensburg, Germany, and Roland Wittje, Indian Institute of Technology Madras, Chennai, India

24th Conference of the International Society for the Philosophy of Chemistry (ISPC 2020), Buenos Aires, Argentina, July 21-July 23, 2020

The 24th Conference of the International Society for the Philosophy of Chemistry (ISPC 2020) will be held from Tuesday July 21 till Thursday July 23, 2020 in Buenos Aires, Argentina, at the CAECE University.

The ISPC 2020 aims at providing a forum for discussion about foundational, epistemological, methodological and ontological problems of chemistry and its subfields, by bringing together leading researchers and young scholars from all over the world.

Issues debated in the philosophy of chemistry emerge from three communities: the chemists, reflecting on the foundations of their science, the philosophers of science, investigating the nature and specifics of chemistry, and the historian of chemistry, making sense of the pathways to discoveries and the practices of chemistry in the past.

For more information see [here](#).

For all further queries, please do not hesitate to

send us an email at

ispc2020.buenosaires@gmail.com

European Society for History of Science Biennial Conference, Bologna, August 31-September 3, 2020

The 9th International Conference of the European Society for the History of Science (ESHS), hosted by the Centre for the History of Universities and Science at the University of Bologna (CIS) and by the Italian Society for the History of Science (SISS), will take place in Bologna, from the 31st of August to the 3rd of September 2020.

The theme of the 2020 meeting is Visual, Material and Sensory Cultures of Science, a very broad and inclusive topic. Sessions and talks might address the history of the sensory approaches to scientific objects, their material culture, as well as the building of scientific practices based on the use of the senses (vision, hearing, touch and smell), with particular attention to the history of the relationship between the visual arts and the sciences across nations, periods, and historiographies; visual epistemologies and the cultural practice of thinking scientifically with images; and the relationship between different media (print, photography, digital imaging, etc.) and scientific disciplines in various social, political, and economic contexts.

Given the developments of the discipline in the past twenty years, we see this theme as particularly topical and capable of generating broad historical questions at the same time. This theme will provide ample opportunity to take stock and reflect on “sensory cultures” and on the “visual turn”, to assess their strengths and weaknesses,

but also to explore their relationship with competing or overlapping historiographical trends such as the material and global history of science, medicine and technology.

Submission date: 15 December 2019 Details available [here](#).

World Logic Day, January 14

The proclamation of January 14 as the [World Logic Day](#) has been adopted by the Executive Council of UNESCO. The proposal was presented by the Brazilian Ambassador at UNESCO, Maria Edileuza Fontenele Reis. The 1st World Logic Day was celebrated in about 60 locations all over the world on January 14, 2019

This was described in the paper “[1st World Logic Day: 14 January 2019](#)” which was the basic document that was used to build the proposal.

Everybody is welcome to organise a celebration. Info about all the celebrations will be gathered in a single webpage with links to all the celebrations in the world.

Jean-Yves Beziau

Editor-in-Chief [Logica Universalis](#)

President of the [Brazilian Academy of Philosophy](#)

Association for History of Scientific Knowledge in Central, Eastern and South-Eastern Europe

We are delighted to be able to share with you the new online platform HPS.CESEE, which aims to facilitate the exchange of information about the

history of scientific knowledge in Central, Eastern and Southeastern Europe. Our aim is to serve as a resource for the history of scientific knowledge in the region stretching from Prague to Perm and from Tallinn to Tirana, or from (present) Albania and Austria to (former) Soviet Union and Yugoslavia. We will keep you updated about conferences, events, new publications, journals and positions in our field - via our blog (<https://hpscseee.blogspot.com/>), newsletter, and social media: Facebook (<https://www.facebook.com/groups/hps.cesee/>) and Twitter (<https://twitter.com/hpscseee>).

As HPS.CESEE is a community project, inspired by H-Net and H-Soz-u-Kult, we will rely on the information we receive from our members and followers - so please forward this information to colleagues, students and other members of the History of Science community broadly construed. Please read our blog, subscribe to our newsletter, and follow us on social media, and send us information you would like to be circulated. And please contact us if you are interested in joining our editorial team.

To learn more about HPS.CESEE and the editorial team, please visit <https://hpscseee.blogspot.com/p/about-us.html>

You can contact the editors of HPS.CESEE here: hps.cesee@gmail.com

4th International Conference on Science and Literature, University of Girona, Spain, 2-4 July 2020

Following the successful three International Conferences on Science and Literature which took

place in Athens, Poellau and Paris, this Conference is the fourth to be organized under the aegis of the Commission on Science and Literature DHST/UHPST. The fourth International Conference will be organised by the Càtedra Dr. Bofill de Ciències I Humanitats (Dr Bofill Chair on Science and the Humanities) integrated at the University of Girona (UdG) with the technical support of the Commission on Science and Literature. The Conference will be organised along thematic sessions. Those proposed by the Organising Committee are:

- Science in Western Art
- Literature and Medicine
- Science and Religion
- Poetry and Science
- Scientific Genres in Science Fiction
- Mathematics, Physics and Literature
- Women in the History of Science, Philosophy and Literature

Other themes, according to the papers accepted by the Scientific Committee, can be organised.

Proposals for individual papers or panels of three or four papers should be submitted by February 29th, 2020. They must include the title of the paper (or the theme of the panel), name and affiliation of the author(s), an abstract of no more than 350 words and a short CV.

Proposals and inquiries about practical matters may be sent to gvlahakis@yahoo.com and cgamez@unav.es. Juan Ortega will be the chair of the Local Organising Committee.

Further information available [here](#).

Opinion: *The Defence of Science and the Status of Māori Knowledge*

Michael Corballis, Elizabeth Rata and Robert Nola

Mike Corballis (FRSNZ) is an emeritus professor in Psychology at the University of Auckland and a recipient of the Rutherford Medal. He is best known for his work on brain asymmetry, language and evolution.

Elizabeth Rata is a professor of sociology in education and a Fulbright Senior Fellow. She is the Director of the Knowledge in Education Research Unit at the University of Auckland.

Robert Nola (FRSNZ) is an Emeritus Professor in Philosophy at the University of Auckland with an interest, amongst other philosophical matters, in the history and philosophy of science, particularly the logic and methodology of science.

On the whole, science is one of the most successful human endeavours. But it is not without its sceptics and critics who would weaken, and even reject, both the claims and methods of science and its technological applications. The noise of the anti-vaccers, the climate-change deniers, the footpath lichen eaters, and the ‘alternative fact’ claimants are impossible to ignore – ask those dealing with the return of measles in New Zealand. In a recent article in the New York Times on the measles epidemic in the United States and the rise of anti-vaccination sentiment, a prominent expert on infectious diseases is quoted as saying: “Science has become just another voice in the room. It has lost its platform. Now, you simply declare your own truth.” [1]. If this is so, then science has lost all authority as a system of knowledge

and as a way of getting it. So, anything goes!

On a larger scale there have been the science deniers who adopt competing world views such as one of the various religions, a mystical world view or one of the many different, often incompatible, ethnic traditions to be found in the world. In this essay we wish to consider one example of the last of these which is prominent in New Zealand, Mātauranga Māori. This is often translated as ‘Māori knowledge’ and we will go along with this; but alternatives might be ‘Māori lore’ or ‘Māori belief systems’ (the last is particularly apt especially if one wishes to avoid the implication that talk of *knowing that* must always involve *truth*).

The growing effort to incorporate Mātauranga Māori into New Zealand science policy and education is in line with a world-wide movement toward “indigenisation.” Here, we examine the relations between science and Mātauranga Māori, and conclude that while Mātauranga Māori has much to offer in terms of culture and values, it also subverts those aspects of science—namely objectivity, universality, and dedication to progress—that can further advance the understanding of nature and help find solutions to the major problems afflicting the planet. At a time when acceptance and understanding of science are at a low ebb, indigenisation of science can only weaken its effectiveness, to the detriment of all, including indigenous cultures.

Here we wish to provide a critical evaluation of the relationship between science and Mātauranga Māori. Most scientists do not consider this, either because they are too busy getting on with the job of doing science or it is not part of their background training to consider such issues. But it is important to defend the values of science, its authority through the means of rational discussion, and the

methods it employs in objective inquiry. We are fully aware that science must continually justify itself. We also know that science, or more strictly its applications, have been used to do harm—to individuals, to society, to the planet. But we also know that the applications of science have done enormous good.

Important here is the distinction between the methods of science and the purposes for which it is used; between how science is ‘done’ and what it is used for. Our aim is to put a stake in the ground in defence of science’s methods. We ask that these methods be seen as separate from the purposes to which science’s discoveries and technologies are put (but this is not to say that science has nothing to say about these matters, such as Bayesian decision theory). Those purposes are ethical, political, and social and should be publicly debated. The methods of science however belong to science.

Blurring the Boundaries

In recent decades there has been a blurring of the boundaries between science and folk knowledge throughout the world. This is unsurprising because the two types of “knowledge” can overlap. In New Zealand Mātauranga Māori is the body of knowledge encompassing the traditional Māori way of viewing the world. This is broadly encompassing as “the knowledge, comprehension or understanding of everything visible and invisible in the world” (Hikuroa, 2017, p. 6).

As such Mātauranga Māori may well come into conflict with not only science as it has developed but also other religions and rival ethnic world views. However, it is also evident that it can include knowledge which has been scientifically es-

tablished in order to solve problems. This may also be the case with other folk belief systems throughout the world.

Since science emerged from folk and traditional knowledge through the application of criticism and of scientific methods it is inevitable that some similarities will remain; so why is the blurring of boundaries a problem? Surely recognising traditional knowledge can only support justice for those indigenous peoples today who campaign for their knowledge to be recognised as somehow on a par with science and included in the teaching and practice of science, including the university curriculum? From Irish, and Catalan, to Māori, Sami, and indigenous American, there is a call in many parts of the world for traditional knowledge and values to be incorporated alongside science’s universal understandings.

This call also talks of respect for the balance between humans and the natural world, saying that indigenous peoples have maintained that balance with care for the environment embodied in their traditional knowledge. In New Zealand, this is used to justify the recognition of Mātauranga Māori as at least on a par with science in informing science and its practices.

Mātauranga Māori in Relation to Science

Given the increasing recognition of folk knowledge world-wide and the strength of that recognition in New Zealand’s science organisations it’s timely to ask: How does Mātauranga Māori relate to science? This question is especially pertinent given the Mātauranga Māori’s decade-long connection to science in the government’s Vision Mātauranga policy. Since its inception in 2005, the policy’s overall aim is “to unlock the innova-

tion potential of Māori knowledge, resources and people to assist New Zealanders to create a better future” (Ministry of Research, Science and Technology, 2007, p. 2). It is to be achieved by fostering connections between Māori, government, the science system and industry and by providing support for the development of iwi-led research and development strategies.

Vision Mātauranga is now deeply embedded in New Zealand’s research institutions. The Ministry of Business, Innovation and Employment includes Mātauranga Māori in its investment priority areas as do Crown Research Institutes. Researchers seeking funding, for example to the Royal Society Marsden Fund, must state how they will include Mātauranga Māori in their research.

It is true that society’s interests are central to judging the purposes of science and the uses to which it is put. The current measles epidemic is a timely reminder of our interest in the MMR vaccine and herd immunity. However, the methods of science are accountable to science itself. The MMR vaccine, along with the process of vaccination itself (as far back to Jenner and Pasteur, if not before), was largely developed in accordance with scientific methods not according to folk knowledge about the disease.

Hikuroa (2017) builds on several decades of publications justifying an alleged “equivalence” of traditional knowledge and science. He explains the nature of Mātauranga Māori and deplores the way it has been disregarded and neglected by the science community as “myth and legend, fantastic and implausible” (p. 5). Such writings and the Ministry’s *Vision Mātauranga* make a case for the creative potential of Māori knowledge and ways of thinking, and urge that it be incorporated into the mainstream of science and business.

But the Royal Society article and *Vision Mātauranga* also note that science differs from Mātauranga Māori, notably with respect to methods. We agree with the article’s comment that the methods are what makes a significant difference: “While there are many similarities between Mātauranga Māori and science, it is important that the tools of one are not used to analyse and understand the foundations of another” (Hikuroa, 2017, p. 9)

This is a major difference and raises serious questions as to whether the two “knowledge” types should be considered to be “equivalent”, whatever “equivalent” means here, and how this might be achieved. But this idea is problematic. Consider some claim, such as “The Earth orbits the Sun”. One may come to hold this on the basis of a séance, or a matter of faith, or because some Holy Book says so, or because it is society’s traditional belief, and so on. But none of these provides the kind of evidence on the basis of which Copernicus and Galileo came to make this claim.

What this illustrates is that two people might hold the same belief but quite different pathways have led to it; some scientific some not. Clearly this does not make for equivalence of belief systems. As illustrated, there is a lack of equivalence founded in the different method that was employed by Copernicus and others to arrive at his claim. In the light of this, science and Mātauranga Māori cannot in any good sense be regarded as equivalent as bodies of belief; the difference lies in the method and evidence used to justify the belief.

Similarities

The similarities between science and traditional knowledge derive from their shared origins. This has long been understood and leads to some simil-

arities in purpose, method, and objects of inquiry. A fundamental shared purpose arises from the human need to understand the natural and social world and, as a result, to control and manage its people and resources.

Both knowledge types also can have some similarity of method. Traditional knowledge and/or belief makes assumptions and inferences, a practice also found in the hypotheses used in science. Here we can tentatively advance the claim that our ancestors might have developed cognitive abilities involving the use of proto-rules of investigation that led to proto-science. (We leave it to science to tell us whether this is so or not.)

Even granting this, it is an approach which can lead us to “false starts” such as the Greek idea of ‘humours’ in medicine. In fact, the history of science shows us that “false starts” were the norm and these had to be criticised before science was to advance. Scientifically incorrect conceptual models, such as in astronomy and alchemy along with many other theories such as racial superiority, have traditional origins, but have been shown to have no foundation.

Science and folk knowledge also study many of the same subjects. Indeed, the mainstays of folk knowledge world-wide are about botanical, navigational, medical and geographical knowledge. This knowledge continues to provide insights for science and shows the value of a relationship between the two types of knowledge. What the nature of this relationship is, however, needs considerable discussion.

Differences: Change and Challenge

It is only in looking closely at the differences between folk knowledge and science that we are

able to enter into a meaningful discussion about how they relate. The impetus behind the relentless advance of science is unceasing doubt and challenge. The philosopher Karl Popper, at one time resident in New Zealand, made a proposal along the lines that any scientific theory must be open to potential falsification. If the theory cannot possibly be proven wrong, it is not scientific. But this requirement, one that make science ‘science’, can also be a destabilising force. That our cherished theories of science are open to being shown false challenges the authority of tradition, the very tradition which authorises the way things are—‘culture’ in other words. Science overturns the past while traditional knowledge tends to valorise it.

Hikuroa (2017, p.6) refers to the method of whakapapa, the “cognitive genealogical framework” of Mātauranga Māori that connects ideas of today to those of the ancestors. He contentiously maintains, among other things, that “[In] Māori cosmogony, because there is only one set of primal parents (Ranginui and Papatūānuku, from whom everything ultimately traces descent), all things are related.” (ibid., p. 6). Though much within Mātauranga Maori can survive within science and with a scientific basis, this claim is highly unlikely to do so.

Ongoing links with the past provide stability by *not* doubting—by linking the cultural knowledge, beliefs, and practices of today to their history. This cultural cement binds individuals to the group and the group to the ancestors. It gives traditional knowledge its mana and status. In a period of indigenous cultural revival the value of traditional knowledge is jealously guarded. This can lead to disagreement about who may use the knowledge, how it can be used, and to whom researchers are accountable.

A different attitude to truth was clearly illustrated by the Moriori incident at New Zealand's national museum in 1999 (Munz, 2000). Four History professors took Te Papa to task for the omission in its Moriori exhibition of all references to the 1835 conquest of the Chatham Island by 'mainland' Māori and massacre of a great portion of the traditional Melanesian-Moriiori population who had been living there since, probably, the 1500s. The professors accused the museum of misrepresentation and suppressing the truth.

The dispute shows different forms of accountability and authority. An acknowledged Mātauranga Māori expert and a key figure in the *Vision Mātauranga* policy provided a clear demonstration of the difference in his defence of the exhibition: "People who do not understand Mātauranga Māori may have difficulty in understanding there are many different standards of truth. Since relations between Maori Te Ati Awa and Moriiori remain contentious more light is shed by the omission of certain events than by their inclusion" (quoted by Munz, 2000, p.13). He added that the Museum was justified in suppressing the truth about the massacre because it "accepts the inherent value of Mātauranga Māori". The Director of Te Papa Museum added that "it was racist to reveal truths which show the Maori invaders in a bad light (p. 13)." This approach to truth could not be tolerated in science nor in any serious social science.

The histories of all nations, ethnic groups, religions, political movements and institutions are punctuated with awkward, if not plainly outrageous, episodes that most acknowledge, regret and try to learn from. It is not in anyone's interest to deny or cover-up these episodes. The 'do not offend' approach to Māori history taken by the National Museum is no more justified than some

German, French, Polish approaches to holocaust history. Or Chinese Communist Party approaches to Cultural Revolution or Tiananmen Square history. Or countless other histories where a shade is lowered over embarrassing historical episodes.

Is Mātauranga Māori 'science' or is it a distinctive Māori world view? If the knowledge is 'science' then it is accountable to the various scientific disciplines. If it is traditional knowledge, then it is accountable to iwi (Māori groupings) authority. Hikuroa (2017) does identify this contradiction but doesn't seem to see it as one, saying instead that mātauranga Māori "does include knowledge generated using techniques consistent with the scientific method but explained according to a Māori world view" (p. 5).

This attempt to evade the inconsistency is not acceptable. The techniques or methods he refers to are universal ones. If Mātauranga Māori were to be subjected to the criticism and disciplinary authority of peer review, as in the sciences, it ceases to be traditional knowledge and becomes science—available to all scientists including those from different cultural backgrounds, and importantly, available for challenge and change.

Broughton and McBreen (2015) also address relations between mātauranga Māori and science, but reach a somewhat different conclusion:

Although there will be opportunities to work together, that is not the goal of revitalising mātauranga. The goal is not partnership; it is tino rangatiratanga and instituting mātauranga as a primary and independent knowledge system. Future relationships will be between equals (p. 86).

If indeed mātauranga Māori is after all distinct and independent enterprise, there seems little justification in imposing it on scientific research and

teaching.

Differences: Objective Knowledge

Scientific disciplines are built around originating ideas which change as they are put to the test. The best-known idea that has changed dramatically as a result of challenge is the idea that the sun went round the earth changing to the earth going round the sun (the traditional Māori view was not Copernican). Science is replete with examples of how well-established views, or core fundamental hypotheses, came to be rejected and replaced by novel and more powerful ideas in the course of the development of science. (We leave the reader to pick their own favourite examples.) Unlike traditional beliefs they are not fixed to the particular environment within which they were first developed. And this is to be expected given the critical function of scientific methods applied to every science itself. This is why science is universal in its practice and universal in its truth-claims.

You may not be the scientist who first thought of, say, radio waves or the first who identified how they could be used, but you can certainly think about radio waves. You can observe the physical properties that the idea represents and how the idea can be used in technology. The use of electricity in lighting, heating and power is a good example of this while the idea of neuronal discharge is used in understanding how the senses work, and even in how the imagination works. Ideas such as cognitive dissonance have a role in understanding how beliefs are established. And what's more, you don't have to be of the same social group as the first scientist. You may live in a different time, in a different place, belong to a different gender, race, or religion. The idea doesn't care about your social status. The scientific claim, contention or idea, is

an object—available to all universally.

Conclusion

Vision Mātauranga has been operating in our universities and research institutions for over a decade, a state of affairs justified by the perceived “equivalence” between the two types of knowledge. A current advertisement for a lecturer in Zoology at Otago University shows how accepted the inclusion of Mātauranga Māori has become. The advertisement speaks of *advancing Mātauranga Māori/Te Ao Māori perspectives in the study of Zoology with the position affording an exciting opportunity for an emerging scholar to research and teach from a kaupapa Māori perspective*. What does this mean? Does it mean the inclusion of folk knowledge? If so, with what consequences? In New Zealand, is time to discuss these questions.

Our contribution has been to point out the similarities between science and mātauranga Māori, but we have also identified differences that are significant. We would encourage a role for Māori to bring something of their rich knowledge and traditions into science; but insist that the science so informed be done by the usual standards and methods. The extent and implication of these differences suggest that the relationship between science and mātauranga Māori be re-considered. At the very least, the matter should be discussed publicly. Comparable discussions can profitably occur in many countries where similar indigenisation education and policy programmes are supported.

In an age where trust in science has weakened we need ways to restore that trust. Recognising science's distinctiveness and power is a starting point.

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Invitation to Submit Opinion Piece

In order to make better educational use of the wide geographical and disciplinary reach of this HPS&ST NEWSLETTER, 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 [Michael Matthews](#) or [Nathan Oseroff-Spicer](#).

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 NEWSLETTER.

They will be archived in the OPINION folder at the HPS&ST web site: <http://www.hpsst.com/>.

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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)
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- Susan Haack, Philosophy and Law Departments, University of Miami, [The Future of Philosophy, the Seduction of Scientism](#) (November 2017).
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- Heinz W. Drodste, [An Interview with Mario Bunge](#) (May 2017).
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Recent HPS&ST Research Articles

Science & Education (Vol. 28, Issue 8, October 2019). Thematic Issue; Scientific Practices, Epistemic Aims, and Learning Progressions. Guest Editors: Ashlyn Pierson, Douglas Clark, Gregory Kelly

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Recent HPS&ST Related Books

Alger, Bradley (2019). *Defense of the Scientific Hypothesis: From Reproducibility Crisis to Big Data*. Oxford, UK: Oxford University Press.

ISBN: 978-0-190-88148-1

“*Defense of Scientific Hypothesis: From Reproducibility Crisis to Big Data* sets out to explain and defend the scientific hypothesis. Alger’s mission is to counteract the misinformation and misunderstanding about the hypothesis that even seasoned scientists have concerning its nature and place in modern science. Most biological scientists receive little or no formal training in scientific thinking. Further, the hypothesis is under attack by critics who claim that it is irrelevant to science. In order to appreciate and evaluate scientific controversies like global climate change, vaccine safety, etc., the public first needs to understand the hypothesis. *Defense of Scientific Hypothesis* begins by describing and analyzing the scientific hypothesis in depth and examining its relationships to various kinds of science. Alger then guides readers through a review of the hypothesis in the context of the Reproducibility Crisis and presents survey data on how scientists perceive and employ hypotheses. He assesses cognitive factors that influence our ability to use the hypothesis and makes practical and policy recommendations for teaching and learning about it. Finally, Alger considers two possible futures of the hypothesis in science as the Big Data revolution looms: in one scenario, the hypothesis is displaced by the Big Data Mindset that forgoes under-

standing in favor of correlation and prediction. In the other, robotic science incorporates the hypotheses into mechanized laboratories guided by artificial intelligence. But in his illuminating epilogue, Alger envisions a third way, the Centaur Scientist, a symbiotic relationship between human scientists and computers.” (From the Publisher)

More information available [here](#).

Arredondo, Jaime Marroquin, Ralph Bauer (Eds.) (2019). *Translating Nature: Cross-Cultural Histories of Early Modern Science*. Philadelphia, PA: University of Pennsylvania Press.

ISBN: 978-0-812-25093-0

“*Translating Nature* recasts the era of early modern science as an age not of discovery but of translation. As Iberian and Protestant empires expanded across the Americas, colonial travellers encountered, translated, and reinterpreted Amerindian traditions of knowledge—knowledge that was later translated by the British, reading from Spanish and Portuguese texts. Translations of natural and ethnographic knowledge therefore took place across multiple boundaries—linguistic, cultural, and geographical—and produced, through their transmissions, the discoveries that characterize the early modern era. In the process, however, the identities of many of the original bearers of knowledge were lost or hidden in translation.

“The essays in *Translating Nature* explore the crucial role that the translation of philosophical and epistemological ideas played in European scientific exchanges with American Indians; the ethnographic practices and methods that facilitated appropriation of Amerindian knowledge; the ideas and practices used to record, organize, translate, and conceptualize Amerindian naturalist knowledge; and the persistent presence and influence of Amerindian and Iberian naturalist and medical knowledge in the de-

velopment of early modern natural history. Contributors highlight the global nature of the history of science, the mobility of knowledge in the early modern era, and the foundational roles that Native Americans, Africans, and European Catholics played in this age of translation.” (From the Publishers)

More information available [here](#).

Barnett, Ronald & Bengtson, Søren S.E. (2019). *Knowledge and the University Re-claiming Life*, Abingdon, UK: Routledge.

ISBN: 978-1-138-33099-3

“For hundreds of years, knowledge has been central in understanding the university. Over recent decades, however, it is the economic value of knowledge that has come to the fore. Now, in a post-truth world, knowledge is also treated with suspicion and has become a vehicle for ideologies. *Knowledge and the University* combats all these ways of thinking. Its central claim is that knowledge is of value because of its connection with life. Knowledge is of life, from life, in life and for life.

“With an engaging philosophical discussion, and with a consideration of the evolution of higher education institutions, this book:

- Examines ways in which research, teaching and learning are bound up with life;
- Looks to breathe new life into the university itself;
- Widens the idea of the knowledge ecology to embrace the whole world;
- Suggests new roles for the university towards culture and the public sphere.

“*Knowledge and the University* is a radical text that looks to engender nothing less than a new spirit of the university. It offers a fascinating read for policy

makers, institutional leaders, academics and all interested in the future of universities.” (From the Publisher)

More information available [here](#).

Cartwright, Nancy (2019). *Nature, the Artful Modeler: Lectures on Laws, Science, How Nature Arranges the World and How We Can Arrange It Better*. Chicago, IL: Open Court.

ISBN: 978-0-812-69468-0

“Possibilities, powers, capacities, the absence of laws and an open future: Nancy Cartwright offers us an original vision of nature and our place therein, brilliantly interleaved with moral insight and detailed explorations of scientific practice ...How could anyone read this fascinating, provocative work without their own views being impacted?” – Bas Van Fraassen

Review by Eric Winsberg, The University of South Florida available [here](#).

More information available [here](#).

Curry, H. A., Jardine, N., Secord, J.A., & Spary, E. C. (Eds.) (2018). *Worlds of Natural History*. Cambridge, UK: Cambridge University Press.

ISBN: 978-1-108-22522-9

“This massive, comprehensive, and extremely rich collection of essays features a stellar cast of contributors who have created a worthy sequel to *Cultures of Natural History*. From its elegant introduction to its colorful chapters and provocative afterword on the continuing vitality of natural history in the twenty-first century, this book fascinates and instructs. Dazzled by its contents, readers will have a difficult time deciding which compartment

in this cabinet of curiosities to open first. This is scholarship in the history of science at its finest.” – Bernard Lightman, Fellow of the Royal Society of Canada, President of the History of Science Society, and York University

“This volume offers a cornucopia of new approaches to writing the history of natural history from the Renaissance to today. With attention to shifting epistemologies and material cultures, it situates ancient traditions of collecting, classifying, and preserving nature in relation to the modern biological and earth sciences. In our present era of vanishing biological diversity, the authors consider the lessons of the past for the future of both elite and popular scientific institutions, from seed banks to museums and zoos.” – Deborah R. Coen, Yale University, Connecticut

“*Worlds of Natural History* comes as close as is humanly possible to living up to its title. The essays illuminate almost every aspect of the vast enterprise of natural history, from collecting, networking, and voyaging to preserving, image-making, and classifying. Its sites are as various as the Renaissance apothecary’s shop and the contemporary genetics lab; its locales criss-cross the globe. This book crystallizes decades of historical scholarship, and is the single best introduction to the topic.’ – Lorraine Daston – Director, Max Planck Institute for the History of Science, Berlin

More information available [here](#).

D’Olimpio, Laura (2019). *Media and Moral Education: A Philosophy of Critical Engagement*. Abingdon, UK: Routledge.

ISBN: 978-0-367-36796-1

“*Media and Moral Education* demonstrates that the study of philosophy can be used to enhance critical thinking skills, which are sorely needed in today’s technological age. It addresses the current oversight of the educational environment not keeping

pace with rapid advances in technology, despite the fact that educating students to engage critically and compassionately with others via online media is of the utmost importance.

“D’Olimpio claims that philosophical thinking skills support the adoption of an attitude she calls critical perspectivism, which she applies in the book to international multimedia examples. The author also suggests that the Community of Inquiry – a pedagogy practised by advocates of Philosophy for Children – creates a space in which participants can practise being critically perspectival, and can be conducted with all age levels in a classroom or public setting, making it beneficial in shaping democratic and discerning citizens.

“This book will be of interest to academics, researchers and postgraduate students in the areas of philosophy of education, philosophy, education, critical theory and communication, film and media studies.” (From the Publishers)

More information available [here](#).

Dry, Sarah (2019). *Waters of the World: The Story of The Scientists Who Unraveled The Mysteries of Our Oceans, Atmosphere, and Ice Sheets and Made The Planet Whole*. Chicago, IL: The University of Chicago Press. ISBN: 978-0-226-50770-5

“Part history, part biography, part scientific tutorial, part philosophy, Dry humanizes and personalizes the science of climate change as it has evolved over time. By focusing on a wide selection of important contributors dating back to the eighteenth and nineteenth centuries (Tyndall, Smyth, Riehl, Malkus Simpson, Stommel, Dansgaard, and numerous others) the human story emerges from the science. She describes the fits and starts, the emotional elements, conceptual and observational difficulties, and the sheer fun these scientists had along the way as the understanding of climate emerged as a serious intellectual endeavor.” – Carl Wunsch, Cecil

and Ida Green Professor of Physical Oceanography, Emeritus, Massachusetts Institute of Technology

“In compelling portraits of six scientists and their work, Dry probes the origins of what we now call climate science. She brings alive scientific mysteries about glaciers, clouds, oceans and the atmosphere to show how our present understanding of climate as a complex global system developed over the last 170 years. It’s a brilliant historical jigsaw puzzle, revealing how big questions about our planet have evolved and interlocked. But more than this, she makes a powerful argument about what it means to study the earth. Our knowledge of our planet, and our place on it, grew from concerns and assumptions that are as dynamic and full of change as the natural phenomena we study. How are we driven to ask the questions about nature that we do? Dry’s answers take us to the human heart of science. Exploring her subjects with unfailing insight, she brings each individual set of intellectual passions into focus. Stepping gracefully from Victorian England to late twentieth-century Greenland, her biographies illuminate the combination of speculation, observation, calculation, and assumptions that have shaped science at different moments in the past. As she says, global visions come from individuals, particular places and moments in time. Such a profoundly human account of knowledge-building may be our best guide to thinking about the planet’s future.” – Katharine Anderson, York University

“*Waters of the World* offers a far-reaching and wonderfully unique take on the history of climate science. Focusing on key scientists, some less known than others, the book illustrates vividly and through fine details how studies of different forms of water—from a fluid in the Atlantic Ocean to rainfall in the Indian Monsoon, clouds at the root of hurricanes, and glacial ice on mountain tops and polar ice sheets—were all fundamental for our present-day understanding of both water and the global climate. Dry is an expert at tracing the deep scientific questions of the day, showing how specific scientists—fascinating people themselves—spent their lives try-

ing to resolve those intellectual puzzles of the global environment.” – Mark Carey, University of Oregon

More information available [here](#).

Ephraim, Laura (2017). *Who Speaks for Nature? On the Politics of Science*. Philadelphia, PA: University of Pennsylvania Press.

ISBN: 978-0-812-24981-1

“When natural scientists speak up in public about the material phenomena they have observed, measured, and analyzed in the lab or the field, they embody a distinctive version of political authority. Where does science derive its remarkably resilient, though often contested, capacity to give voice to nature? What efforts on the part of scientists and non-scientists alike determine who is regarded as a legitimate witness to material reality and whose speech is discounted as idle chatter or mere opinion?”

“Laura Ephraim reveals the roots of scientific authority in what she calls ‘world-building politics’: the collection of practices through which scientists and citizens collaborate with and struggle against each other to engage natural things and events and to construct a shared yet heterogeneous world. Through innovative readings of some of the most important thinkers of science and politics of the near and distant past, including René Descartes, Thomas Hobbes, Giambattista Vico, and Hannah Arendt, Ephraim argues that the natural sciences are political because they are crucial sites in which the worldly relationships that bind together the human and nonhuman are inherited, augmented, and reconstructed.

“Who Speaks for Nature?” opens a novel conversation between political theory, science, and technology studies and augments existing efforts by feminists, environmentalists, and democratic theorists to challenge the traditional binary separating nature and politics. In an age of climate change

and climate-change denial, Ephraim brings theoretical understandings of politics to bear on real-world events and decisions and uncovers fresh insights into the place of scientists in public life.” (From the Publishers)

More information available [here](#).

Festa, Lynn (2019). *Fiction Without Humanity: Person, Animal, Thing in Early Enlightenment Literature and Culture*. Philadelphia, PA: University of Pennsylvania Press. ISBN: 978-0-812-25131-9

“Although the Enlightenment is often associated with the emergence of human rights and humanitarian sensibility, “humanity” is an elusive category in the literary, philosophical, scientific, and political writings of the period. *Fiction Without Humanity* offers a literary history of late seventeenth- and early eighteenth-century efforts to define the human. Focusing on the shifting terms in which human difference from animals, things, and machines was expressed, Lynn Festa argues that writers and artists treated humanity as an indefinite class, which needed to be called into being through literature and the arts.

“Drawing on an array of literary, scientific, artistic, and philosophical devices— the riddle, the fable, the microscope, the novel, and trompe l’œil and still-life painting— *Fiction Without Humanity* focuses on experiments with the perspectives of nonhuman creatures and inanimate things. Rather than deriving species membership from sympathetic identification or likeness to a fixed template, early Enlightenment writers and artists grounded humanity in the enactment of capacities (reason, speech, educability) that distinguish humans from other creatures, generating a performative model of humanity capacious enough to accommodate broader claims to human rights.

More information available [here](#).

Glick, Megan H. (2018). *Infrahumanisms: Science, Culture, and the Making of Modern Non/personhood*. Durham, NC: Duke University Press. ISBN: 978-1-478-00151-5

“In *Infrahumanisms* Megan H. Glick considers how conversations surrounding nonhuman life have impacted a broad range of attitudes toward forms of human difference such as race, sexuality, and health. She examines the history of human and nonhuman subjectivity as told through twentieth-century scientific and cultural discourses that include paediatrics, primatology, eugenics, exobiology, and obesity research.

“Outlining how the category of the human is continuously redefined in relation to the infrahuman—a liminal position of speciation existing between the human and the nonhuman—Glick reads a number of phenomena, from early twentieth-century efforts to define children and higher order primates as liminally human and the post-war cultural fascination with extraterrestrial life to anxieties over AIDS, SARS, and other cross-species diseases. In these cases the efforts to define a universal humanity create the means with which to reinforce notions of human difference and maintain human-nonhuman hierarchies. In foregrounding how evolving definitions of the human reflect shifting attitudes about social inequality, Glick shows how the consideration of nonhuman subjectivities demands a rethinking of long-held truths about biological meaning and difference.” (From the Publishers)

More information available [here](#).

Grote, Mathias (2019). *Membranes to Molecular Machines: Active Matter and The Remaking of Life*. Chicago, IL: The University of Chicago Press. ISBN: 978-0-226-62529-4

“*Membranes to Molecular Machines* is a masterful study of the hidden origins in chemical practice and an explanation of much of today’s molecular biology. As Mathias Grote sheds light on how scientists unraveled molecular mechanisms related to energy, metabolism, and cognition, he expands the scope of our historical understanding and crucially enriches our theoretical armory. In giving scientists’ investigations of active biomolecules center stage, and in arguing for a materialism based on chemical concepts and practices, Grote draws the lines of the historiography of the modern life sciences anew.” – Carsten Reinhardt, Bielefeld University

“In the 1950s and 1960s, the determination of the structure of DNA and the decipherment of the genetic code were revolutionary events in biology that have been often and well described. It is not the case for the process of molecularization of biology, which was initiated in the 1970s and transformed the whole discipline. In this book, Mathias Grote describes a lesser-known—but probably one of the most significant—episodes of this molecularization: the conversion of the monotonous structure of cellular membranes into an organized ensemble of superb macromolecular machines. It was a leap in our understanding of the functions of cellular membranes, and one that opened a door to new therapeutic approaches to numerous diseases.” – Michel Morange, Centre Cavallès, Ecole Normale Supérieure

“How have we come to understand life and our own bodies in terms of molecular machines? This question drives Mathias Grote’s fascinating inquiry. Focusing on cell membranes, channels, and pumps as paradigmatic objects of analysis and synthesis, Grote forcefully argues that there has always been more than genes to the molecular study of life. This book is a major new contribution to both the history and philosophy of recent biology and our understanding of a molecular vision of life.” – Soraya de Chadarevian, University of California, Los Angeles

“According to the dominant narrative in the history of biology, the most important developments in the last half of the twentieth century centered on DNA and genetics. In *Membranes to Molecular Machines*, Mathias Grote argues that this history omits other areas of the life sciences not illuminated by the spotlight of the DNA saga. One such area is what Grote calls the ‘materialization’ of membrane machines. Using the fascinating story of bacteriorhodopsin as a case study, he follows the discovery of the protein through its structural determination by electron microscopy to the description of its function as a light-stimulated proton pump. Along the way, he reviews the development of the biological membrane concept from early models to reconstitution studies, and impressively exploits interviews and the personal archives of leading investigators to construct his account. In this way, he produces a fuller and more accurate view of the history of biology in the twentieth century.” – Karl Matlin, University of Chicago and the Marine Biological Laboratory

More information available [here](#).

Kleinberg, Samantha (Ed.) (2019). *Time and Causality across the Sciences*. Cambridge, UK: Cambridge University Press. ISBN: 978-1-108-59270-3

“This book, geared toward academic researchers and graduate students, brings together research on all facets of how time and causality relate across the sciences. Time is fundamental to how we perceive and reason about causes. It lets us immediately rule out the sound of a car crash as its cause. That a cause happens before its effect has been a core, and often unquestioned, part of how we describe causality. Research across disciplines shows that the relationship is much more complex than that. This book explores what that means for both the metaphysics and epistemology of causes - what

they are and how we can find them. Across psychology, biology, and the social sciences, common themes emerge, suggesting that time plays a critical role in our understanding. The increasing availability of large time series datasets allows us to ask new questions about causality, necessitating new methods for modeling dynamic systems and incorporating mechanistic information into causal models.” (From the Publisher)

More information available [here](#).

Mahner, Martin (2018). *Naturalismus – Die Metaphysik der Wissenschaft*. Aschaffenburg: Alibri-Verlag. ISBN: 978-3-86569-223-8

“This book tackles a number of questions related to the “nature of science” debate: What is the relationship between science and metaphysics? Isn’t metaphysics the exact opposite of science? Isn’t science better off without it because all that counts in science are empirical methods and evidence? What is the role of metaphysical naturalism in science then? Is it dispensable because science has no philosophical presuppositions whatsoever? Is it a philosophical outcome of its 400-year history? Or must naturalism be true even before scientific research can begin? In Kantian terms: is naturalism a condition of the very possibility of science? Is naturalism actually a metaphysical condition or just a methodological or hypothetical assumption?

“Can naturalism-based science investigate only natural things and processes? Or could it just as well deal with the supernatural, thereby falsifying naturalism? Can the natural be clearly defined in the first place and thus even distinguished from the supernatural? Does reference to supernatural causes have explanatory power? Is naturalism a criterion for demarcating science and pseudo-science? Does Ockham’s razor help to decide between naturalism and supernaturalism? Or can it be applied only in a naturalist context? What, finally, is the relationship

between science and religion: are they compatible or incompatible?” (English text provided by the author)

More information available [here](#).

Mitcham, Carl (2019). *Steps toward a Philosophy of Engineering: Historico-Philosophical and Critical Essays*. Lanham, MD: Rowman & Littlefield. ISBN: 978-1-78661-127-7

“The rise of classic Euro-American philosophy of technology in the 1950s originally emphasized the importance of technologies as material entities and their mediating influence within human experience. Recent decades, however, have witnessed a subtle shift toward reflection on the activity from which these distinctly modern artifacts emerge and through which they are engaged and managed, that is, on engineering. What is engineering? What is the meaning of engineering? How is engineering related to other aspects of human existence? Such basic questions readily engage all major branches of philosophy — ontology, epistemology, ethics, political philosophy, and aesthetics — although not always to the same degree. The historico-philosophical and critical reflections collected here record a series of halting steps to think through engineering and the engineered way of life that we all increasingly live in what has been called the Anthropocene. The aim is not to promote an ideology for engineering but to stimulate deeper reflection among engineers and non-engineers alike about some basic challenges of our engineered and engineering lifeworld.” (From the Publisher)

More information available [here](#).

Okasha, Samir (2019). *Philosophy of Biology: A Very Short Introduction*. Oxford, UK: Oxford University Press. ISBN: 978-0-198-80699-8

“Over the last forty years the philosophy of biology has emerged as an important sub-discipline of the philosophy of science. Covering some of science’s most divisive topics, such as philosophical issues in genetics, it also encompasses areas where modern biology has increasingly impinged on traditional philosophical questions, such as free will, essentialism, and nature vs nurture.

“In this *Very Short Introduction* Samir Okasha outlines the core issues with which contemporary philosophy of biology is engaged. Offering a whistle-stop tour of the history of biology, he explores key ideas and paradigm shifts throughout the centuries, including areas such as the theory of evolution by natural selection; the concepts of function and design; biological individuality; and the debate over adaptationism. Throughout Okasha makes clear the relevance of biology for understanding human beings, human society, and our place in the natural world, and the importance of engaging with these issues.” (From the Publisher)

More information available [here](#).

Pitt, Joseph C. (2019). *Heraclitus Redux: Technological Infrastructures and Scientific Change*. Lanham, MD: Rowman & Littlefield. ISBN: 978-1-78661-235-9

“Scientific change is often a function of technological innovation – new instruments show us new things we could not see before and we then need new theories to explain them. One of the results of this process is that what counts as scientific evidence changes, and how we do our science changes. Hitherto the technologies which make contemporary science possible have been ignored. This book aims to correct that omission and to spell out the consequences of taking the technologies behind the doing of science seriously.” (From the Publisher)

More information available [here](#).

Primiero, Giuseppe (2019). *On the Foundations of Computing*. Oxford, UK: Oxford University Press. ISBN: 978-0-198-83564-6

“Computing, today more than ever before, is a multi-faceted discipline which collates several methodologies, areas of interest, and approaches: mathematics, engineering, programming, and applications. Given its enormous impact on everyday life, it is essential that its debated origins are understood, and that its different foundations are explained. *On the Foundations of Computing* offers a comprehensive and critical overview of the birth and evolution of computing, and it presents some of the most important technical results and philosophical problems of the discipline, combining both historical and systematic analyses.

“The debates this text surveys are among the latest and most urgent ones: the crisis of foundations in mathematics and the birth of the decision problem, the nature of algorithms, the debates on computational artefacts and malfunctioning, and the analysis of computational experiments. By covering these topics, *On the Foundations of Computing* provides a much-needed resource to contextualize these foundational issues.

“For practitioners, researchers, and students alike, a historical and philosophical approach such as what this volume offers becomes essential to understand the past of the discipline and to figure out the challenges of its future.” (From the Publisher)

More information available [here](#).

Roberts, David Lindsay (2019). *Republic of Numbers: Unexpected Stories of Mathematical Americans through History*. Baltimore, MD: Johns Hopkins University Press. ISBN: 978-1-421-43308-0

“Once upon a time in America, few knew or cared about math. In *Republic of Numbers*, David Lindsay Roberts tells the story of how all that changed, as America transformed into a powerhouse of mathematical thinkers. Covering more than 200 years of American history, Roberts recounts the life stories of twenty-three Americans integral to the evolution of mathematics in this country. Beginning with self-taught Salem mathematician Nathaniel Bowditch’s unexpected breakthroughs in ocean navigation and closing with the astounding work Nobel laureate John Nash did on game theory, this book is meant to be read cover to cover.

“Revealing the marvelous ways in which America became mathematically sophisticated, the book introduces readers to Kelly Miller, the first black man to attend Johns Hopkins, who brilliantly melded mathematics and civil rights activism; Izaak Wirszup, a Polish immigrant who survived the Holocaust and proceeded to change the face of American mathematical education; Grace Hopper, the “Machine Whisperer,” who pioneered computer programming; and many other relatively unknown but vital figures. As he brings American history and culture to life, Roberts also explains key mathematical concepts, from the method of least squares, propositional logic, quaternions, and the mean-value theorem to differential equations, non-Euclidean geometry, group theory, statistical mechanics, and Fourier analysis. *Republic of Numbers* will appeal to anyone who is interested in learning how mathematics has intertwined with American history.” (From the Publisher)

More information available [here](#).

Sattarov, Faridum (2019). *Power and Technology: A Philosophical and Ethical Analysis*. Lanham, MD: Rowman & Littlefield. ISBN: 978-1-78661-129-1

“The notion of technological power is fast becoming an object of both academic and policy discourses. Within such discourses one can ob-

serve several different senses of power being employed, especially when viewed from a multi-disciplinary angle. This demonstrates the need for the creation of a cross-disciplinary and integrative framework for identifying and clarifying different conceptions of the relations between technology and power. In this respect, the book aims to offer an empirically-informed philosophical framework for understanding the technological construction of power, which allows for a differentiated vocabulary for describing various senses of technological power, while bridging together social and political theory, critical studies of technology, philosophy and ethics of technology. In addition, the framework presented in this book aims to contribute to better critical and ethical evaluation of technologies and their powers. Any adequate ethics or critique of technology must be based on a better, clearer, and more nuanced and differentiated understanding of the many ways in which technology can be described as ‘powerful.’” (From the Publisher)

More information available [here](#).

Shafiei, Mohammad, Pietarinen, Ahti-Veikko (Eds.) (2019). *Peirce and Husserl: Mutual Insights on Logic, Mathematics and Cognition*. Dordrecht: Springer. ISBN: 978-3-030-25800-9

“This volume aims to provide the elements for a systematic exploration of certain fundamental notions of Peirce and Husserl in respect with foundations of science by means of drawing a parallelism between their works. Tackling a largely understudied comparison between these two contemporary philosophers, the authors highlight the significant similarities in some of their fundamental ideas.

“This volume consists of eleven chapters under four parts. The first part concerns methodologies and main principles of the two philosophers. An introductory chapter outlines cent-

ral historical and systematical themes arising out of the recent scholarship on Peirce and Husserl. The second part is on logic, its Chapters dedicated to the topics from Peirce’s Existential Graphs and the philosophy of notation to Husserl’s notions of pure logic and transcendental logic. The third part includes contributions on philosophy of mathematics. Chapters in the final part deal with the theory of cognition, consciousness and intentionality. The closing chapter provides an extended glossary of central terms of Peirce’s theory of phaneroscopy, explaining them from the viewpoint of the theory of cognition.” (From the Publisher)

More information available [here](#).

Thompson, Ken (2019). *Darwin’s Most Wonderful Plants: A Tour of His Botanical Legacy*. Chicago, IL: The University of Chicago Press.
ISBN: 978-0-226-67570-1

“For many people, the story of Charles Darwin goes like this: he ventured to the Galapagos Islands on the Beagle, was inspired by the biodiversity of the birds he saw there, and immediately returned home to write his theory of evolution. But this simplified narrative is inaccurate and lacking: it leaves out a major part of Darwin’s legacy. He published *On the Origin of Species* nearly thirty years after his voyages. And much of his life was spent experimenting with and observing plants.

“Darwin was a brilliant and revolutionary botanist whose observations and theories were far ahead of his time. With *Darwin’s Most Wonderful Plants*, biologist and gardening expert Ken Thompson restores this important aspect of Darwin’s biography while also delighting in the botanical world that captivated the famous scientist.

Thompson traces how well Darwin’s discoveries have held up, revealing that many are remarkably long-lasting. Some findings are only

now being confirmed and extended by high-tech modern research, while some have been corrected through recent analysis. “We learn from Thompson how Darwin used plants to shape his most famous theory and then later how he used that theory to further push the boundaries of botanical knowledge. We also get to look over Darwin’s shoulder as he labors, learning more about his approach to research and his astonishing capacity for hard work. Darwin’s genius was to see the wonder and the significance in the ordinary and mundane, in the things that most people wouldn’t look at twice.

“Both Thompson and Darwin share a love for our most wonderful plants and the remarkable secrets they can unlock. This book will instil that same joy in casual gardeners and botany aficionados alike.” (From the Publisher)

More information available [here](#).

Zimring, James C. (2019). *What Science Is and How It Really Works*. Cambridge, UK: Cambridge University Press. ISBN: 978-1-108-56914-9

“We live in a world where the discoveries of well-done science are rapidly improving the lives of millions; but at the same time poorly done inquiry that fails to meet the foundational principles of science, even when carried out with all good intentions, can result in harmful false conclusions resulting in wasting of resources, bad results for individuals and bad public policy for nations. Dr Zimring has produced a marvelously cogent and eminently readable book that explains how to recognize good science and know when to question poor ‘scientific’ conclusions. Reading this book places scientists and non-scientists on the same playing field when discussing critical issues and making important decisions. I would feel much better going to the polls if every voter understood the lessons that Zimring effortlessly communicates.” – Brian R. Smith, Yale University, Connecticut

“The message of this extraordinary book is loud and clear: we need a better understanding of science. That it is written by a scientist - and aimed in part at a scientific audience - makes the message all the more credible ... and urgent. Science may not be perfect, but it is the best hope we’ve got. Zimring has written an engaging and accessible book on the importance of digging beneath what we think we know about science.” – Lee McIntyre, Boston University and author of *The Scientific Attitude: Defending Science from Denial, Fraud, and Pseudoscience*

More Information available [here](#).

Authors of HPS&ST-related papers and books are invited to bring them to attention of [Paulo Maurício](#) or [Nathan Oseroff-Spicer](#) for inclusion in these sections.

Coming HPS&ST Related Conferences

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](#).

January 8-9, 2020, ‘Universals Locales’, British Academy Sponsored, University of Edinburgh.

Details: <http://mathglobal.org/locales.html>

January 8-9, From Scientific Pluralism to Pluralism in HPS, University of Exeter, UK

Details: Alex Aylward (a.m.aylward@leeds.ac.uk) and Adrian Currie (a.currie@exeter.ac.uk)

January 17-17, 2020, How Quantum Mechanics Changed Philosophy, University of Wuppertal,

Germany

Inquiries to vanstrien@uni-wuppertal.de

January 20-21, 2020, International Workshop on the Philosophy of Cancer Biology, University of Bordeaux, France.

Details available [here](#).

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

More information available [here](#).

March 30 – April 1, 2020, Rudolf-Carnap-Lectures & Graduate Workshop 2020. Ruhr-University Bochum. Germany.

More information available [here](#).

April 3-4, 2020, Mid-South Philosophy of Science (MSPS) 2020 Meeting. Virginia Tech Blacksburg, VA, USA.

Inquiries to Justin Donhauser at jdonhau@bgsu.edu with “MSPS 2020” in the subject line.

April 17-18, 2020, Joint Atlantic Seminar for the History of East Asian Science, Technology, and Medicine. John Hopkins University, Baltimore, MD, USA.

Details at: <https://jaseastm.org/>

May 11-14, 2020, Sixth International Conference on the Nature and Ontology of Spacetime. Albena, Bulgaria.

More information available [here](#).

June 16-17, 2020, International Workshop on Disciplinary Identity: Insights from the History and Philosophy of Chemistry. Hebrew University of Jerusalem, Israel.

Details available [here](#).

June 29 – July 3, 2020, Objects of Understanding: Historical Perspectives on Material Artefacts and Practices in Science Education. Europa-Universität, Flensburg, Germany.

Inquiries at OoU-conference@uni-flensburg.de

June 29 – July 1, 2020, Measurement at the Crossroads 2020 – Measuring and Modeling. Milan, Italy. More information available [here](#).

June 30 – July 2, 2020, 7th annual conference of the International Association for Philosophy of Time. Barcelona, Spain.

Inquiries at iapt7barcelona@gmail.com

July 2-4, 2020, 4th International Conference on Science and Literature, University of Girona, Spain.

Details at: <http://icscienceandliterature.com/>

July 8-11, 2020, British Society for History of Science Annual Conference, Aberystwyth University, Wales.

Information at: <http://bshsaberystwyth2020.info/>

July 9-11, 2020, 6th International STEM in Education Conference, Vancouver, Canada.

Details at: www.stem2020.ubc.ca

July 15-17, 2020, 8th Integrated History and Philosophy of Science Conference (&HPS8). Virginia Tech, Blacksburg VA.

Information: Lydia Patton (critique@vt.edu) or Jutta Schickore (jschicko@indiana.edu)

July 21-23, 2020, 24th Conference of the International Society for the Philosophy of Chemistry. Buenos Aires, Argentina.

More information available [here](#).

November 19-22, 2020, Twenty-Seventh Biennial Meeting of the PSA. Baltimore, Maryland.

Details at: <https://psa2020.philsci.org/>

August 10-14, 2020, Bayesian Epistemology: Perspectives and Challenges. MCMP, LMU Munich.

Details available [here](#).

August 31-September 3, 2020, European Society for History of Science Biennial Conference, Bologna.

Details available [here](#).

July 4-8, 2021, IHPST 16th International Conference, University of Calgary, Canada

Details from Glenn Dolphin:

glenn.dolphin@ucalgary.ca.

July 25-31, 2021, 26th International Congress of History of Science and Technology (DHST), Prague

Information: <https://www.ichst2021.org/>

July 24-29, 2023, 17th DLMPST Congress, University of Buenos Aires Information: Pablo Lorenzano,

pablo@unq.edu.ar.

HPS&ST Related Organisations and Websites

IUHPST – International Union of History, Philosophy, Science, and Technology

DLMPST – Division of Logic, Mathematics, Philosophy, Science, and Technology

DHST – Division of History, Science, and Technology

IHPST – International History, Philosophy, and Science Teaching Group

NARST – National Association for Research in Science Teaching

ESERA – European Science Education Research Association

ASERA – Australasian Science Education Research Association

ICASE – International Council of Associations for Science Education

UNESCO – Education

HSS – History of Science Society

ESHS – European Society for the History of Science

AHA – American History Association

ISHEASTME – International Society for the History of East Asian History of Science Technology and Medicine

BSHS – British Society for History of Science

EPSA – European Philosophy of Science Association

AAHPSSS - The Australasian Association for the History, Philosophy, and Social Studies of Science

HOPOS – International Society for the History of Philosophy of Science

PSA – Philosophy of Science Association

BSPS – The British Society for the Philosophy of Science

SPSP – The Society for Philosophy of Science in Practice

ISHPSB – The International Society for the History, Philosophy, and Social Studies of Biology

PES – The Philosophy of Education Society (USA)

The above list is updated and kept on the HPS&ST website [HERE](#).

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