

# HPS&ST

## NEWSLETTER



# HPS&ST NEWSLETTER

JANUARY 2022

The HPS&ST NEWSLETTER is emailed monthly to about 9,500 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/or interests in the promotion of innovative, engaging and effective teaching of the history and philosophy of science. The NEWSLETTER is sent on to different international and national HPS lists and international and national science teaching lists. In print or electronic form, it has been published for 40+ years.

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.

Contributions to the NEWSLETTER (publications, conferences, opinion pieces, etc.) are welcome and should be sent direct to the editor: Michael R. Matthews, UNSW ([m.matthews@unsw.edu.au](mailto: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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ISSN: 2652-2837

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## The 16th Biennial International History and Philosophy of Science and Science Teaching Group (IHPST) Conference, Calgary, Canada. 3-7 July, 2022

Conference Theme: Energising Education with the History, Philosophy, and Sociology of Science

The province of Alberta is the oil-sands energy centre of Canada. It has been the locale for debate about fossil fuel usage, environmental impacts, renewal energy production, First Nations relations and much else.



### Plenary Speakers:

- [Dr. Alison Wylie](#), of the University of British Columbia, is a philosopher of social and historical sciences. She is currently President of the Philosophy of Science Association, and Past-President of the American Philosophical Association, Pacific Division. Dr. Wylie works on philosophical issues raised by archaeological practice, and by feminist research in the social sciences.
- [Dr. Carol Cleland](#), of the University of Colorado Boulder and current Director of UC

Boulder's Center for the Study of Origins, focusses her research on issues concerning scientific methodology (historical science vs. experimental science, the role of anomalies in scientific discovery), biology (microbiology, origins of life, the nature of life, and astrobiology), and the theory of computation. She is the inventor of the term 'shadow biosphere,' a subject on which she has written and lectured extensively.

- Optional field trips to [Burgess Shale](#), [Royal Tyrell Museum](#), and [Frank Slide/Bellevue mine](#)
- Original dramatic production, *Formations*, about four important women earth scientists, their discoveries and their experiences of being a woman in a male dominated career field. Written by [Meg Braem](#) and directed by [Christine Brubaker](#)
- Graduate student [Summer School](#) session
- Undergraduate virtual poster presentation
- Practicing teacher symposium
- Conference dinner at [Heritage Park](#)

First call for abstract submission for early decision- 31 October 2021–15th December 2021

Last call for abstract submission - 28 February 2022 - decision until 30th March 2022

Because of the ever-evolving COVID-19 situation, the conference will be a hybrid event. Presenters not traveling to Calgary can submit a pre-recorded presentation that will be played live during the appropriate session. Remote presenters can attend, synchronously, via Zoom (most likely) to answer questions. For a reduced registration fee, remote conference participants can gain access to sessions as they are happening.

Conference will also feature dedicated sessions to the following issues: Racial justice/decolonization; Accessibility; Gender equality.

Please visit [www.ihpst.net](http://www.ihpst.net) for submission instructions and further information.

## Science & Literature Commission

It is a great pleasure to inform you that finally two thematic volumes have been published as e-books based on papers presented in our previous conferences and workshops. We may find, download freely and distribute them as widely as you wish [here](#) and [here](#).

We would like to thank everybody related to these publications and especially the contributors.

For 2022 we plan also a number of activities, which we expect to take place in person if the pandemic conditions will be improved.

The main event we organise is our 4th International Conference on Science and Literature which will take place in Girona, Spain, 30 June-2 July 2022.

We would like to thank a lot our colleague Carlos Manuel Gamez Perez for all his efforts and we invite you all to participate in this promising Conference which will be held also in a wonderful town.

For any issue and assistance concerning the Conference and your trip to Girona you may contact directly Carlos at [cgamez@xtec.cat](mailto:cgamez@xtec.cat)

We plan also our 5th Workshop in Syros 18-20 July 2022. The theme of the Workshop will be announced by the end of the year.

At the beginning of September 2022 we plan to organise an international summer school on science and literature in the framework of science communication. The venue will be on Andros Island. More information will be available also by the end of the year.

Last but not least we would like to inform you that we are going to coorganise in Athens, 19-23 September 2022 the 41st Symposium of the Scientific Instrument Commission.

George N. Vlahakis  
National Hellenic Research Foundation  
[gvlahakis@yahoo.com](mailto:gvlahakis@yahoo.com)

## Linda Hall Library Fellowships

The [Linda Hall Library](#) is now accepting applications for its 2022-23 fellowship program. These fellowships provide graduate students, postdoctoral researchers, and independent scholars in the history of science and related fields with financial support to explore the Library's outstanding science and engineering collections. Fellows also participate in a dynamic intellectual community alongside in-house experts and scholars from other Kansas City cultural and educational institutions.



The Linda Hall Library holds nearly half a mil-



lion monographs and more than 43,000 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, earth science, environmental studies, aeronautics, life science, infrastructure studies, mathematics, and the history of the book.

The Linda Hall Library is offering three types of fellowships during the 2022-23 academic year:

- Residential fellowships (1-4 months) support scholars who travel to Kansas City to conduct research in the Library's collections.
- The History of Science and Medicine fellowship (1 month) supports a doctoral student who travels to Kansas City to conduct research at the Linda Hall Library and the Clendening History of Medicine Library at the University of Kansas Medical Center.
- Virtual fellowships (1-4 months) support scholars working remotely using resources from the Library's digital collections. Virtual fellows receive personalised research assistance from reference staff and may request complementary scans of Library resources in accordance with our in-house digitisation policies.

In each case, fellowship funding is offered at a rate of \$3,000 per month for doctoral students and \$4,200 per month for postdoctoral researchers.

The Linda Hall Library is committed to fostering a diverse and inclusive research environment and encourages members of any groups that have traditionally been underrepresented in academia to apply for fellowship support.

Please share this announcement with graduate students, colleagues, or anyone else who might be interested in the Library's fellowship program. All application materials are due no later than **January 21, 2022**. For further information, visit [here](#) or email [fellowships@lindahall.org](mailto:fellowships@lindahall.org).

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## HPS&ST in Latin America

- *Caderno Brasileiro de Ensino de Física* (a Brazilian Physics Education journal founded in 1984) is now accepting papers on Physics Education and Science Education written in English, Spanish and Portuguese. The journal publishes three issues a year and it displays a special section for papers on History, Philosophy and Sociology of Science and Science Education. The journal editors invite the researchers of HPS&ST community to submit their manuscripts to be considered for publication. Moreover, they invite researchers who may be interested in evaluating submitted manuscripts to register in the journal system. Information may be found [here](#).



- Events

XX IOSTE Symposium (International Organization for Science and Technology Education) will be held in Federal University of Pernambuco and Mar Hotel Conventions, Recife, Brazil, from July 25th to 29th. The theme of the event will be 'Esperançar in uncertain times: the role of science and technology education in/for a changing world', an allusion to Paulo Freire's concept of *Esperança* ('hope'). The event presents a special strand for submissions of HPS&ST field. Information is available [here](#).

The sixth Escola Paranaense de História e Filosofia da Ciência was held virtually from November 23rd to November 26th. The main course, offered by Andrew Feenberg (Simon Fraser University - Canadá) and Bernadette Bensaude-Vincent (Université Paris 1 - França) is available [here](#).

- Publications

*Revista de Enseñanza de la Física* has just published a special issue with publications from the XXII REF (Reunión de Educación en Física). The papers are available [here](#).

- RICE's Epistemology and History of Science Study Group

*Red Internacional de Investigación en Enseñanza de las Ciencias* (RIEC, (International Network for Science Teaching, in a free translation) has the general purpose of favoring the inter-relationship between different institutions and graduate programs to expand research strategies, innovation, socialization, and graduate development at an international level. It is currently made up of more than 20 institutions from different research groups and Graduate Programs from four different countries, namely: Argentina, Brazil, Chile, and Colombia.

RIEC emerged in 2017 and has been expanding since then by the efforts of researchers from graduate Programs doing research in Science Teaching and participating through their Institutions. Currently RIEC is based at the Universidad Pedagógica Nacional (UPN) in Bogotá-Colombia and operates with a scope guided by: "space for interaction, training of researchers and production of Graduate researches are interested in topics related to Science Teaching" and has as its main area of activity Teaching-as-Research in: Natural Sciences (Biology, Physics and Chemistry), Science Teaching, Environmental Education, Mathematics, Engineering and Technology.

In 2020, the efforts of the participating researchers led to the creation of a study group on Epistemology and History of Science (HS) with the intention of developing research activities at the Graduate level and to deepen the understanding of the research on this theme in Science Teaching. In this sense, we have developed systematic meetings to bring together studies already conducted by the researchers participating in the group, seeking to foster joint research and spaces and times for collective production. In the current scenario, we also

realise that research at the graduate level cannot be done without the process of internationalisation, which begins with the constitution of research networks that expand these formative spaces and times beyond the borders of each country and graduate program.

In the meetings already held, it is possible to notice that the theoretical nuances are diverse, which implies acknowledging that there are countless possibilities of perceiving the research in Epistemology within the scope of graduate in Science Teaching, which always places us in the challenge of moving from what we know to what we can learn, and from how we research to what others research. This double movement broadens the inter-relationships of research and teaching and makes possible the dialogue between peers, between programs, countries, and languages with different interfaces and a common goal: to improve the processes of science teaching.

Information about the research network may be found [here](#) and [here](#).

### **Do you have any contributions about HPS&ST in Latin America?**

If you have any information about events, publications, research groups, books about HPS&ST in Latin American and want to submit a brief note to be published in the HPS&ST Newsletter, please contact first Nathan Lima [here](#) or secondly Michael Matthews [here](#).

## **Science & Education Open Access Articles**

*Science & Education* journal currently has 73 HPS&ST articles available gratis as Open Access. These can be seen and individually downloaded [here](#).

One article available [here](#) is Damian Fernandez-Beanato 'Feng Shui and the Demarcation Project'. This is a contribution to a coming (December 2021) 8-article thematic issue of the journal on 'Feng Shui: Philosophical, Cultural and Educational Perspectives'.

The thematic issue addresses the subject matter of the book: *Feng Shui: Teaching About Science and Pseudoscience* (Springer 2019).

Material related to Feng Shui and the thematic issue are available [here](#).

## **Nuncius Prize 2022**

The 2022 *Nuncius* Prize, which is supported by Brill Publishing and Museo Galileo in Florence, will be awarded to the best original essay related to the material and visual history of science, technology and medicine in any period.

The prize is intended for those who are currently graduate and doctoral students, or have been awarded their PhD (or equivalent) within the past six years.

The opening date for entries is 00.01 (CET) on 15 September 2021. The closing date of the Prize is 23.59 (CET) on 30 April 2022. Authors should submit their manuscript via the Editorial Manager (EM) online submission system [here](#).



Essays must be:

- unpublished and not submitted to any other competition at the same time
- written in English
- no more than 9,000 words in length (including footnotes)
- referenced in accordance with *Nuncius* guidelines

The winner will receive a cash prize of €500 and the open-access publication in *Nuncius*. Three honourable mentions (€100 of Brill book tokens each) will also be provided.

Non-winners may be invited to publish their work in *Nuncius*, if the judges of the essay award and the journal consider them to be suitable for publication.

More information available [here](#).

Further queries: Prof. [Elena Canadelli](#), at [elena.canadelli@unipd.it](mailto:elena.canadelli@unipd.it)

## Opinion Piece: Following in the Footsteps of Einstein: Modernising Physics Education Using History and Philosophy of Science

*Magdalena Kersting, Education Department, University of Oslo*



[Magdalena Kersting](#) is an educational researcher, physics educator and science communicator based at the University of Oslo in Norway. She took degrees in physics education and mathematics education at Georg-August-Universität Göttingen, and her PhD in physics education at University of Oslo. In her work, Magdalena uses perspectives of history and philosophy of science to enrich science education practices. She has a particular interest in Einsteinian physics education and is the main editor of [Teaching Einsteinian Physics in Schools](#).

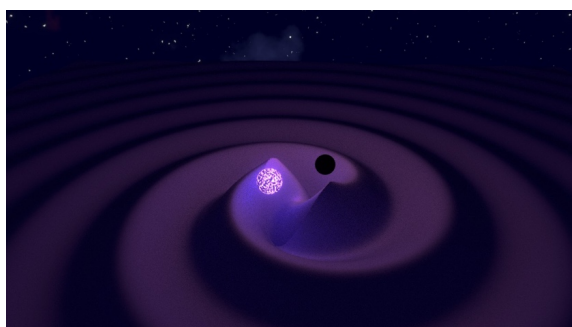
*Creating a new theory is not like destroying an old barn and erecting a skyscraper in its place. It is rather like climbing a mountain, gaining new and wider views, discovering unexpected connections between our starting points and its rich environment. But the point from which we started out still exists and can be seen, although it appears smaller and forms a tiny part of our broad view gained by the mastery of the obstacles on our adventurous way up.* (Albert Einstein & Leopold Infeld, 1938)

### The case for Einsteinian physics education

Albert Einstein changed a whole generation's scientific and philosophical worldview in one impressive stroke of intellectual prowess. By linking

the physics of gravity to the mathematics of curved spaces, Einstein demonstrated one of the most remarkable feats of human thinking - and propelled 20th-century physics into its modern era. From the big bang to black holes, from cosmology to gravitational wave astronomy, the theory of relativity has inspired awe and wonder among scientists and the general public alike.

In February 2016, the LIGO Scientific Collaboration announced the first direct observation of gravitational waves (figure 1). Shortly after, the Nobel Prize committee awarded the 2017 physics prize ‘for decisive contributions to the LIGO detector and the observation of gravitational waves,’ positioning the theory of general relativity at the forefront of research.



*Figure 1 – General relativity describes the dynamic interplay between space, time, and matter. This visualisation depicts a binary system of a black hole and a neutron star and the gravitational waves that ripple outward as the two objects spiral toward each other. (Credit: Mark Myers/Ozgrav, <https://www.ozgrav.org>)*

In 2019, the first image showing the shadow cast by a black hole confirmed yet again general relativity and opened a new era of astrophysics (Akiyama K. et al., 2019). More than one century after Einstein presented the theory of relativity, his ideas seem more popular and relevant than ever.

Nevertheless, to most people nowadays, Einstein’s

ideas still seem as challenging as they did 100 years ago when Bertrand Russell observed that a ‘certain effort of imaginative reconstruction is unavoidable’ if we are to understand the theory of relativity (1925, p. 9). Most children today continue to grow up with notions of classical physics. In many countries, students hardly ever come across modern concepts of space and time in the classroom. Instead, it is left to science popularisers, outreach practitioners, or enthusiastic teachers to teach students our current best understanding of the world outside of the regular physics lessons.

Employing history and philosophy of science in the service of physics education can serve as a successful approach to making Einstein’s ideas more accessible and foster motivation among young learners (Henriksen et al., 2014; Kersting & Blair, 2021; Levrini, 2014; Stadermann & Goedhart, 2021). In fact, historical contextualisation and philosophical perspectives provide many instructional opportunities to help students on their adventurous climb up the mountains of Einsteinian physics to let them gain new vistas and discover unexpected connections between science and society.

In the following, three such opportunities are presented in the context of general relativity education. These opportunities were developed within ReleQuant, an educational project in Norway that pooled the expertise of physicists, physics education researchers, physics teachers, and educational designers to develop digital learning resources and study students’ learning processes and motivation in Einsteinian physics (Henriksen et al., 2014). Parts of this essay are adapted from the ReleQuant PhD thesis ‘General Relativity in Secondary School’ (Kersting, 2019).

## Instructional opportunity 1: focus on the evolution of physics and the nature of science

Often, general relativity is presented as a revolutionary new way to describe gravity, space, and time. Consequently, many educators argue that students must go through ontological conceptual changes to cope with the ‘radical shift to the Einsteinian paradigm’ (Kaur et al., 2018, p. 2506) and that instructional strategies should aim to soften the impact of a counter-intuitive theory (Holton, 1973; Levrini, 2014). However, research suggests that emphasising the radical break between classical and Einsteinian physics might not be the best instructional approach in general relativity education. For example, upper secondary school students in Norway felt baffled or bewildered that much of what they previously had learned about gravity, space, and time was outdated knowledge (Kersting et al., 2018). Instead of focusing on the differences between classical and Einsteinian physics, it might be more fruitful to show the continuity in thought and practice that underlay the evolution from 19th-century physics to our modern understanding (Kim & Lee, 2021).

Here, Einstein’s conception of the evolution of physics provides a valuable starting point. For Einstein, knowledge of the history of physics is valuable because such knowledge emphasises the connections between new ideas and their rich conceptual environments (Einstein & Infeld, 1938). Although the theory of relativity gives us a new physical and philosophical vantage point from which to view reality, this vantage point is not divorced from previous physical methods. Einstein’s thinking followed assumptions that have long guided scientific practice: simplicity, harmony, and universality (Kim & Lee, 2018).

Einstein built on core ideas of Galileo’s principle of

relativity and Maxwell’s theory of electromagnetism to revise our understanding of space and time, consistent with existing physical laws. Rather than seeing the theory of relativity as a radical and fundamental break with classical physics, its development illustrates a rigorous scientific practice that examines physical assumptions together with all its implications carefully.

Einstein’s ideas are, thus, an excellent opportunity to discuss the nature of science and the way scientific knowledge progresses. Science is a process of building models to explain observations and then refining those models through careful thought and experimentation. Good models explain existing observations and make testable predictions. Although Newton’s force model might seem intuitively correct, it does not describe all experimental observations. Educators argue for the re-education of our intuitions to make them compatible with what seems to be the best science around (Chandler, 1994). Helping students build awareness of the scope and limitations of physical theories and showing how general relativity extends classical physics can be one step towards such a re-education (figure 2).

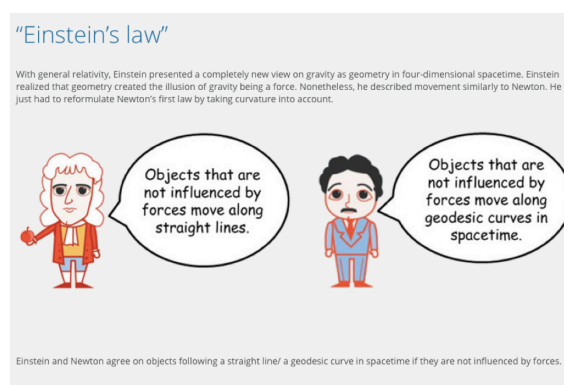


Figure 2 – This instructional approach emphasises the continuity between Newtonian and Einsteinian physics and shows how general relativity extends Newton’s law of motion. The screenshot is

*taken from the digital learning environment General Relativity that is freely available at [www.viten.no/relativity](http://www.viten.no/relativity).*

Besides, our society's collective fascination with Einstein can act as a fruitful entryway to teach and reflect on the nature of science. Einstein is a popular figure in contemporary culture, and students in the ReleQuant project repeatedly mentioned that they enjoyed learning more about Einstein (Kersting et al., 2018). The students appreciated a depiction of Einstein as a person who struggled and had to work hard to find a new theory of gravity. Following some of Einstein's historical struggles helped students relate to Einstein's reasoning and build a qualitative understanding of general relativity. These findings align with previous research on story-based instructional models that improve student motivation and academic performance if the models show how scientists like Einstein made achievements through failures and struggles (Lin-Siegler et al., 2016).

## **Instructional opportunity 2: develop imagination in physics education**

There is no doubt that Einstein was a highly original thinker with a penetrating mind and a boundless imagination. Indeed, Einstein stated that:

Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution." (Einstein as quoted in Viereck, 1929)

Einstein's vivid imagination shed light on physical problems, often in the form of thought experiments. He chased beams of light, sent flashes

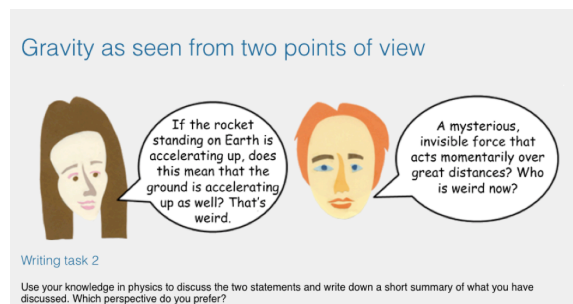
of light off moving trains, or considered a person in free fall. Indeed, many of the fundamental principles in the theory of relativity sprung from famous thought experiments. Einstein used these thought experiments to elucidate physical phenomena and convey key ideas in simple terms. Doing so, he was keenly aware of the importance of honing one's imagination to make discoveries:

If you wish to learn from the theoretical physicist anything about the methods which he uses, I would give you the following piece of advice: Don't listen to his words, examine his achievements. For to the discoverer in that field, the constructions of his imagination appear so necessary and so natural that he is apt to treat them not as the creations of his thoughts but as given realities.' (Einstein, 1933, pp. 5–6)

The history of physics abounds with examples of thought experiments and remarkable imaginative accomplishments (Asikainen & Hirvonen 2014; Kind & Kind, 2007). But it is not only in hindsight that imagination becomes apparent in scientific practice. Today, many scientists acknowledge that imagination plays a significant role in their work (Osborne et al., 2003). Despite this acknowledgement, science education researchers still have little understanding of the role of imagination in the science classroom – or how imagination can be developed through instructional activities (Steier & Kersting, 2019).

General relativity education presents a fascinating opportunity to study the role of imagination in students' learning processes. Relativistic concepts challenge students' everyday experiences and seem to contradict lessons from classical physics. Thus, students need to perform a considerable imaginative effort to overcome their experiential understanding of gravity, space, and

time to understand Einstein's spacetime description (Steier & Kersting, 2019). In particular, secondary school students' imaginative struggle to articulate and conceptualise the notion of spacetime reveals a conceptual tension between Newtonian and Einsteinian frameworks (figure 5).



*Figure 3 – In this task, students discuss gravity from two perspectives to build awareness of the two conceptual frameworks that Einstein and Newton proposed to describe gravitational phenomena. The tension between these frameworks and shifting between them presents students with imaginative challenges. The screenshot is taken from the digital learning environment General Relativity that is freely available at [www.viten.no/relativity](http://www.viten.no/relativity).*

Research in ReleQuant identified various (meta-)imaginative actions that students performed to make sense of this tension and shift fundamental assumptions about the nature of space, time, and gravity (Steier & Kersting, 2019). These actions comprised bodily and gestural depictions, sketches, analogies, and new imagined scenarios. Importantly, these actions built on each other as layers of meaning, and students shifted between these layers as they confronted their own imagination and limitations thereof. It seemed as if metaimagining (i.e. the ability to manage shifts between one's imaginative actions) was required to crosswalk different conceptual frames that entailed different explanations for the same gravitational phenomena (Steier & Kersting, 2019).

Teachers and educators can introduce imaginative activities as tools for students. Such instruction can guide students in intentionally applying thought experiments, constructing new metaphors, or performing abstract ideas collaboratively when confronted with imaginative challenges. Additionally, it is important to recognise situations where conceptual frameworks are in tension and require integration. Recognising these situations as imaginative challenges allows for a more nuanced instructional approach than merely reducing the notion of curved spacetime to a difficult concept (Steier & Kersting, 2019).

### **Instructional opportunity 3: address the philosophical background of general relativity**

The evolution of physics is, of course, closely related to the philosophy of physics. The development of general relativity did not merely provide impetus to the field of physics but prompted a period of great productivity in the philosophy of space and time (Reichenbach, 1928). Not least, this development led to the culmination of a century-long dispute on the nature of space and time (Kersting & Steier, 2018). This dispute reaches back to Newton and Leibniz, who debated the fundamental nature of space and time in the 18th century (Vailati, 1997). While Leibniz viewed space and time as relational, Newton posited that space and time were absolute entities. At the end of the 19th century, philosophers and scientists again challenged the prevailing view of absolute space and time (Mach, 1893; Poincaré, 1898). Against this backdrop, Einstein proposed four-dimensional spacetime as a replacement of static notions of space and time:



It has often been said, and certainly not without justification, that the man of science is a poor philosopher. Why then should it not be the right thing for the physicist to let the philosopher do the philosophising? Such might indeed be the right thing at a time when the physicist believes he has at his disposal a rigid system of fundamental concepts and fundamental laws which are so well established that waves of doubt cannot reach them; but it cannot be right at a time when the very foundations of physics itself have become problematic as they are now. At a time like the present, when experience forces us to seek a newer and more solid foundation, the physicist cannot simply surrender to the philosopher the critical contemplation of the theoretical foundations; for, he himself knows best, and feels more surely where the shoe pinches. In looking for a new foundation, he must try to make clear in his own mind just how far the concepts which he uses are justified and are necessities. (Einstein, 1936, p. 349)

From his experience at the forefront of the development of modern physics, Einstein knew that having cultivated a philosophical habit of mind had made him a better physicist (Howard, 2006). Therefore, Einstein, who explicitly acknowledged the example of Ernst Mach, was a keen advocate of fostering explicit philosophical approaches to physics in the teaching of physics – an attitude that physics educators and teachers nowadays can adopt to promote direct engagement with the philosophy of science:

I fully agree with you about the significance and educational value of methodology as well as history and philosophy of science. So many people today - and even professional scientists - seem to me like somebody who has seen thousands of trees but has never seen a forest. A knowledge of the historic and philosophical background gives that kind of independence from prejudices of his generation

from which most scientists are suffering. This independence created by philosophical insight is - in my opinion - the mark of distinction between a mere artisan or specialist and a real seeker after truth. (Einstein, 1944)

Following Einstein's footsteps, teachers can highlight the historical dispute on space and time and its philosophical implications to introduce general relativity in their classrooms. Instructional approaches can also emphasise that modern physics poses questions for which physicists still have not found unambiguous answers. In focus group interviews, middle and secondary school students appreciated the philosophical and open questions that general relativity brought up (Kersting et al., 2021). These aspects of physics challenged traditional stereotypes of physics and seemed relevant to the students' lives.

## Conclusion

According to Einstein, common sense is 'nothing more than a deposit of prejudices laid down in the mind prior to the age of eighteen' (Barnett, 2005, p. 58). While experiments have repeatedly confirmed Einstein's theories, physics education in schools continues to be dominated by a 19th-century point of view. Consequently, the theory of relativity still contradicts the common sense of many. Thus, it is a noble cause to teach students our current best understanding of the physical world and add Einsteinian physics to the intellectual equipment of young learners.

Topics of Einsteinian physics provide an excellent opportunity to move beyond traditional content-focused instruction and tie physics into our society. For example, the first direct observation of gravitational waves of two merging black holes has

been called the discovery of the century, akin to Galileo's first turning of his telescope to the sky (Grimberg et al., 2019). This exciting time in physics and astronomy represents a critical opportunity to engage students with concepts of Einsteinian physics (Key & Hendry, 2016). Instructional approaches that use history and philosophy of science can help teachers and instructors bring Einsteinian physics into classrooms.

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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

## PhD Theses in HPS&ST Domain

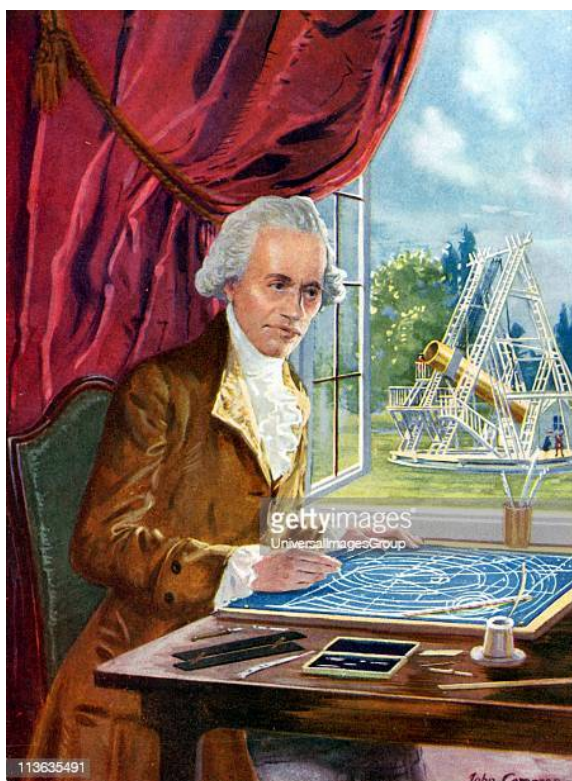
The HPS&ST NEWSLETTER is the ideal medium for publicising and making known submitted and awarded doctoral theses in the HPS&ST domain.

The following details should be submitted to the editor at [m.matthews@unsw.edu.au](mailto:m.matthews@unsw.edu.au):

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

**'Cosmic Harmonies': A Symposium Celebrating the Life, Science, Music, and Legacy of William Herschel (1738-1822), University of York (UK), 19 June 2022**

2022 sees the two-hundredth anniversary of the death of William Herschel, a profoundly significant figure in the field of astronomy, but one who made his early living as a musician - as an oboist, violinist, harpsichordist, organist, composer, and impresario.



After leaving a military band in his native Hanover for an unsuccessful two-year stint in London (1757-59), Herschel moved to the north of England (1760), where he composed his symphonies and many other works as an itinerant musician in Richmond, Newcastle, Sunderland, Durham, Pontefract, Doncaster, Leeds, and Halifax. In 1766 he accepted an invitation as organist at the new Octagon Chapel in Bath, where he became a mainstay of the musical scene for over fifteen years. In Bath he was joined by other musical family members including his sister Caroline, who assisted William first in musical and then in astronomical duties, ultimately becoming a distinguished astronomer in her own right.

Herschel's astronomical interests and construction of very high-quality telescopes, beginning in 1773, brought him to international and lasting fame when he discovered the planet now called Uranus in 1781. He came to the attention of King George III, who summoned him to Windsor and effectively ended the musical portion of his career,

at age 43. For the rest of his life Herschel made numerous ground-breaking contributions: designing large telescopes; mapping the Milky Way system of stars and the Sun's motion in it; cataloguing and classifying thousands of star clusters, nebulae, variable stars, and double stars; proving the effectiveness of gravity outside the solar system; discovering several moons around Saturn and Uranus; discovering infrared radiation (from the Sun); postulating an evolving universe with stars and nebulae that are born, age, and die; estimating the age of the Universe; and arguing that all stars and planets are populated with intelligent beings.

Contemporary academia's separation of music and astronomy across the arts and sciences is something Herschel and other eighteenth-century thinkers would have found hard to understand, given both endeavours proceeded for them on mathematical principles. This symposium takes the bicentenary of his death as a cue to explore new aspects of Herschel's work as composer, instrumentalist, impresario, and astronomer in the intellectual, creative, and cultural contexts of his time. Our symposium will take a wide perspective on astronomy, music, and natural philosophy, including both the Herschels' legacy in science and art today.

Proposals of no more than 200 words should be sent to [Rachel Cowgill](#) University of York by **11 February 2022** with the title 'Herschel Bicentenary Symposium proposal', and should include the author's/co-authors' name, affiliation, and email address.

The symposium will conclude with a public keynote lecture by Professor Tom McLeish FRS (University of York), a panel discussion on Herschel's legacies, and a concert of Herschel's music given



as part of the [York Festival of Ideas](#), 11-24 June 2022. We are grateful for the support of the Festival in organising these bicentenary events. Further activities celebrating the ways science and music interconnect are planned for 2022, organised by the University of York's Sound, Voices, and Technology research network (SoVoT).

## British Society for the History of Science, Singer Prize

The BSHS Singer Prize is awarded every two years to the writer of an essay outstanding in research, novelty and expression, based on original research into any aspect of the history of science, technology or medicine. The prize is intended for recent entrants into the profession. Candidates must be registered for a postgraduate degree or have been awarded such in the five years prior to the closing date. All nationalities are welcome. Essays must not exceed 8,000 words and should be submitted in English. They should adhere to [BSHS guidance to authors](#) in all respects. The prize may be awarded to the writer of one outstanding essay, or may be awarded to two or more entrants. Publication in the *British Journal for the History of Science* will be at the discretion of the Editor. Essays under consideration or in press, either at BSHS or elsewhere, are not eligible. The deadline for submissions is **29 April 2022**. Submissions should be emailed to the BSHS Executive Secretary, Lucy Santos ([office@bshs.org.uk](mailto:office@bshs.org.uk)) with 'Singer entry' and the author surname in the subject line.

A list of previous winners can be seen [here](#).

## European Society for the History of Science (ESHS) tenth annual conference. Brussels, 7-10 September, 2022

Organised by the National Committee for Logic, History and Philosophy of Science of Belgium ([NCLHPS](#)).

The theme of the ESHS 2022 conference will be *Science Policy and the Politics of Science*, a topic with a particular resonance over these past years. From a historiographical viewpoint, the conference will be an opportunity to showcase the latest investigations of scientific institutions across time and space. Beyond the traditional views on history of science governance and management, recent studies have enhanced our understanding of scientific knowledge and practice from global, epistemological, and gendered perspectives, encompassing new experimental and digital methodologies.

We welcome proposals on all periods, geographic locations, and areas of specialisation. Proposals should be submitted by filling in the relevant template which can be found on the [website](#).

The deadline for paper proposals is **21 February 2022, 23:59 CET**.

We particularly encourage proposals that foster gender-equality and diversity, including researchers with various institutional affiliations, at diverse stages of their professional careers, with different geographical origins, and from underrepresented groups.

See [here](#) for more information.

## Society for Philosophy of Science in Practice (SPSP) Ninth Biennial Conference 2–4 July 2022, Ghent University, Ghent, Belgium

### Keynote speakers

Karen Barad, University of California at Santa Cruz

Till Grüne-Yanoff, Royal Institute of Technology (KTH) Stockholm

On-line submission site for paper or session proposals [here](#).

Abstract submission deadline: **1 February 2022**. More information [here](#).

[Alan C. Love](#), Details from Alan C. Love, Department of Philosophy & Minnesota Center for Philosophy of Science, University of Minnesota, [here](#).

### Varia

- **Wallis Suchting**. 12 January 2022 marked the 25th anniversary of the death of Australian Marxist philosopher, and philosopher of science, Wallis Arthur Suchting (1931-1997).

Suchting, after his retirement in 1990, contributed to international science education by writing a series of long and scholarly articles for the journal *Science & Education*. These articles, published yearly from 1992 to 1997, ranged over the cultural significance of science, constructivism, scientific method, the sociology of scientific knowledge, hermeneutics and science, and Newtonian mechanics. They all bear the stamp of his immense scholarship, command of language, impatience with sloppy and

ill-informed writing, and his concern with the ‘truth of the matter’ against all subjectivist and relativist accounts of natural and social science.

An obituary, including a list of his major publications, can be read [here](#).

- **Edward O. Wilson (1929-2021)** the much published and awarded Harvard biologist, naturalist and public advocate of science died on 26 December 2021. His promulgation and defense of sociobiology against critiques by Stephen Jay Gould, a fellow Harvard biologist, was legendary. His career was marked by research and campaigning for biodiversity, and the understanding of biological and human problems in an evolutionary and ecological framework. An account of his life and work can be read [here](#).
- **The Konrad Lorenz Institute for Evolution and Cognition Research (KLI)** in Klosterneuburg (Austria) announces 5 Writing-Up Fellowships for late-stage PhD students working on topics related to ‘Cognition and Knowledge: Between Evolution and Sustainability.’ With this call, the KLI aims to support an interdisciplinary cohort of 5 late-stage PhD students whose works use novel interdisciplinary approaches in the study of cognition and knowledge, especially in relation to evolution and to their connection to sustainability. Learn more about application and deadlines [here](#), and from Dr. Lynn Chiu [here](#).
- **Derya Gürses Tarbuck**, Bahcesehir University, Turkey, seeks 1000-word articles on history of science for a popular Turkish history magazine (comparable to UK magazine *History Today*). Articles should be submitted in English and will be professionally translated. There is no payment for writing, but it’s a great opportunity to be involved in an international exchange

of knowledge and support the Turkish HSTM community. Those interested should contact Derya Gürses Tarbuck [here](#).

- **Eric Schliesser**, Synthetic philosophy (from *Biology & Philosophy*), [here](#)
- **Fake Science**, ‘How Fake Science is Infiltrating Research Journals’, *Sydney Morning Herald* [here](#).
- **Noam Chomsky** on education (science education at 29min) [here](#).
- **Nicholas Maxwell** – ‘More Popperian than Popper’. Interview about Karl Popper’s philosophy of science with Jed Lea-Henry [here](#).
- **Nicholas Maxwell** ‘Our Fundamental Problem: A Revolution for Philosophy and the World’, Humanities, *Arts and Society Magazine*, issue 3, May 2021. [here](#).
- **Nicholas Maxwell** Does the Scientific Community Misconstrue the Nature of Science?, *Global Journal of Research and Review*, 10 August 2021, Vol.8 No.5: [here](#).

## Recent HPS&ST Research Articles

*Ber. Wissenschaftsgesch.* (Vol. 44, Issue 4, December 2021)

Special Issue: Scientific Authority and the Politics of Science and History in Central, Eastern, and Southeastern Europe

Editors: Friedrich Cain, Dietlind Hüchtker, Bernhard Kleeberg, Karin Reichenbach, Jan Surman

*Centaurus* (Volume 63, Issue 4, November 2021)

Special Issue: Making power visible: Codifications, infrastructures, and representations of

energy

Editors: Felix Frey, Jonas Schädler

Ampatzidis, G., Ergazaki, M. How Did Darwin Prefer His Tea? The Socio-Cultural Embeddedness of Science Through a Tea-Time Story. *Sci & Educ*, 1-20. doi:[10.1007/s11191-021-00305-z](#).

Bøe, M.V., Viefers, S. (2021). Secondary and University Students’ Descriptions of Quantum Uncertainty and the Wave Nature of Quantum Particles. *Sci & Educ*, 1-30. doi:[10.1007/s11191-021-00297-w](#).

Chang, H.-Y. (2021). Science teachers’ and students’ metavisualization in scientific modeling. *Science Education*, 1– 28. doi:[10.1002/sce.21693](#).

Chmielewski, A. (2021). Critical Rationalism and Trust in Science. *Sci & Educ*, 1-20. doi:[10.1007/s11191-021-00317-9](#).

Darrigol, O. (2021). Boltzmann’s reply to the Loschmidt paradox: a commented translation. *EPJ H* 46, 29. doi:[10.1140/epjh/s13129-021-00029-2](#).

Develaki, M. (2021). Trustworthiness of Science in Debate: Challenges, Responses, and Implications. *Sci & Educ*, 1-28. doi:[10.1007/s11191-021-00300-4](#).

Duarte, N., Massi, L. & Teixeira, L.A. (2021). The Committed Objectivity of Science and the Importance of Scientific Knowledge in Ethical and Political Education. *Sci & Educ*, 1-21. doi:[10.1007/s11191-021-00302-2](#).

El-Hani, C. N. & Reis, C. R. M. (2021). Research strategies and value outlooks in scientific practices: For an organicist thinking and a pluralist

methodology in the biological sciences. *Philosophy World Democracy*. Available [here](#).

Greenslade, T.B. (2021). American Nineteenth-Century Manufacturers and Importers of Philosophical Apparatus. *Phys. Perspect.*, 1-29. doi:[10.1007/s00016-021-00273-5](#) online first

Kotowski, M., Szlachcic, K. (2021). Deconstructing the Phantom: Duhem and the Scientific Realism Debate. *Found Sci*, 1-23. doi:[10.1007/s10699-021-09823-z](#) online first

Li, X., Li, Y. & Wang, W. Long-Lasting Conceptual Change in Science Education: The Role of U-shaped Pattern of Argumentative Dialogue in Collaborative Argumentation. *Sci & Educ*, 1-46. doi:[10.1007/s11191-021-00288-x](#).

Llored, J.-P. (2021). Chemistry and Measurement: Some Philosophical Lessons. *Perspectives on Science*, 29(6), 782–801. doi:[10.1162/posc\\_a\\_00394](#).

Manz, E., Beckert, B. Quantification in Empirical Activity: Tracing Children's Interests and Ideas. *Sci & Educ*, 1-34. doi:[10.1007/s11191-021-00301-3](#).

Martens, N.C.M. (2022). Dark Matter Realism. *Found Phys* 52, 16. doi:[10.1007/s10701-021-00524-y](#).

McAleer, J. (2021). 'The troubles of collecting': William Henry Harvey and the practicalities of natural-history collecting in Britain's nineteenth-century world. *The British Journal for the History of Science*, 1-20. doi:[10.1017/S0007087421000704](#) online first

Park, S., Kite, V., Suh, J. K., Jung, J., & Rachmatullah, A. (2021). Investigation of the relationships among science teachers' epistemic

orientations, epistemic understanding, and implementation of Next Generation Science Standards science practices. *Journal of Research in Science Teaching*, 1– 24. doi:[10.1002/tea.21737](#).

Sangiaco, A., Tanasescu, R., Donker, S. & Hogenbirk, H. (2021). Mapping the evolution of early modern natural philosophy: corpus collection and authority acknowledgement, *Annals of Science*, 1-40. doi:[10.1080/00033790.2021.1992502](#) online first

Simons, M. (2021). History as engagement: The Historical Epistemology of Raymond Aron. *Perspectives on Science*, 1-25. doi:[10.1162/posc\\_a\\_00410](#) online first

Staunton, C., Barragán, C.A., Canali, S. et al. (2021). Open science, data sharing and solidarity: who benefits?. *HPLS* 43, 115. doi:[10.1007/s40656-021-00468-6](#)

## Recent HPS&ST Related Books

Arthur, Richard T. W. (2021). *Leibniz on Time, Space, and Relativity*. Oxford, UK: Oxford University Press. ISBN: 978-0-19284-9-076

'In this book, Arthur gives fresh interpretations of Gottfried Leibniz's theories of time, space, and the relativity of motion, based on a thorough examination of Leibniz's manuscripts as well as his published papers. These are analysed in historical context, but also with an eye to their contemporary relevance. Leibniz's views on relativity have been extremely influential, first on Mach, and then on Einstein, while his novel approach to geometry in his *analysis situs* inspired many later developments in geometry. Arthur expounds the latter in some detail, explaining its relationship to Leibniz's meta-

physics of space and the grounding of motion, and defending Leibniz's views on the relativity of motion against charges of inconsistency. The brilliance of his work on time, though, has not been so well appreciated, and Arthur attempts to remedy this through a detailed discussion of Leibniz's relational theory of time, showing how it underpins his theory of possible worlds, his complex account of contingency, and his highly original treatment of the continuity of time, providing formal treatments in an appendix. In other appendices, Arthur provides translations of previously untranslated writings by Leibniz on *analysis situs* and on Copernicanism, as well as an essay on Leibniz's philosophy of relations. In his introductory chapter he explains how the framework for the book is provided by the interpretation of Leibniz's metaphysics he defended in his earlier *Monads, Composition, and Force* (OUP 2018, winner of the 2019 annual JHP Book Prize for best book in the history of philosophy published in 2018)' (From the publisher)

More information available [here](#).

Cavicchi, E., & Heering, P. (Eds.) (2022). *Historical Scientific Instruments in Contemporary Education*. Leiden: Brill. ISBN: 978-9-004-49966-9

'These essays draw on recent and versatile work by museum staff, science educators, and teachers, showing what can be done with historical scientific instruments or replicas. Varied audiences - with members just like you - can be made aware of exciting aspects of history, observation, problem-solving, restoration, and scientific understanding, by the projects outlined here by professional practitioners. These interdisciplinary case studies, ranging from the cinematic to the hands-on, show how inspiration concerning science and the past can give intellectual pleasure as well as authentic learning to new participants, who might include people like you: students, teachers, curators, and the interested

and engaged public.

'Contributors are Dominique Bernard, Paolo Brenni, Roland Carchon, Elizabeth Cavicchi, Stéphane Fischer, Peter Heering, J.W. Huisman, Françoise Khantine-Langlois, Alistair M. Kwan, Janet Laidla, Pierre Lauginie, Panagiotis Lazos, Pietro Milici, Flora Paparou, Frédérique Plantevin, Julie Priser, Alfonso San-Miguel, Danny Segers, Constantine (Kostas) Skordoulis, Tienke M. van der Spek, Constantina Stefanidou, and Giorgio Strano.' (From the Publisher)

More information available [here](#).

Graves Jr., J. L., & Goodman, A. H. (2021). *Racism, Not Race: Answers to Frequently Asked Questions*. New York, NY: Columbia University Press. ISBN: 978-0-231-20066-0

'The science on race is clear. Common categories like 'Black,' 'white,' and 'Asian' do not represent genetic differences among groups. But if race is a pernicious fiction according to natural science, it is all too significant in the day-to-day lives of racialised people across the globe. Inequities in health, wealth, and an array of other life outcomes cannot be explained without referring to 'race'—but their true source is racism. What do we need to know about the pseudoscience of race in order to fight racism and fulfil human potential?

'In this book, two distinguished scientists tackle common misconceptions about race, human biology, and racism. Using an accessible question-and-answer format, Joseph L. Graves Jr. and Alan H. Goodman explain the differences between social and biological notions of race. Although there are many meaningful human genetic variations, they do not map onto socially constructed racial categories. Drawing on evidence from both natural and social science, Graves and Goodman dismantle the malignant myth of gene-based racial difference.



They demonstrate that the ideology of racism created races and show why the inequalities ascribed to race are in fact caused by racism.

Graves and Goodman provide persuasive and timely answers to key questions about race and racism for a moment when people of all backgrounds are striving for social justice. *Racism, Not Race* shows readers why antiracist principles are both just and backed by sound science.' (From the Publisher)

More information available [here](#).

Hall, K. T. (2022). *Insulin - The Crooked Timber: A History from Thick Brown Muck to Wall Street Gold*. Oxford, UK: Oxford University Press. ISBN: 978-0-192-85538-1

'Before the discovery of insulin, a diagnosis of Type 1 diabetes was a death sentence. One hundred years after a milestone medical discovery, *Insulin - The Crooked Timber* tells the story of how insulin was transformed from what one clinician called 'thick brown muck' into the very first drug to be produced using genetic engineering, one which would earn the founders of the US biotech company Genentech a small fortune.

'Yet when Canadian doctor Frederick Banting was told in 1923 that he had won the Nobel Prize for this life-saving discovery, he was furious. For the prize had not been awarded to him alone - but jointly with a man whom he felt had no right to this honour. The human story behind this discovery is one of ongoing political and scientific controversy.

'Taking the reader on a fascinating journey, starting with the discovery of insulin in the 1920s through to the present day, *Insulin - The Crooked Timber* reveals a story of monstrous egos, toxic career rivalries, and a few unsung heroes such as two little known scientists whose work on wool fibres, carried out in a fume-filled former stable, not only proved

to be crucial in unravelling the puzzle of insulin but ushered in a revolution in biology.

'It was the author's own shocking diagnosis with Type 1 diabetes that prompted him to sit down and write this book, but this story has lessons for us all about what technology can - and more importantly cannot - do for us. As the world pins its hopes on effective and lasting vaccines against Covid-19, these lessons from the story of insulin have never been more relevant.' (From the publisher)

More information available [here](#).

Knauff, M., & Spohn, W. (Eds.) (2021). *The Handbook of Rationality*. Cambridge, MA: The MIT Press. ISBN: 978-0-262-04507-0

'Both analytic philosophy and cognitive psychology have made dramatic advances in understanding rationality, but there has been little interaction between the disciplines. This volume offers the first integrated overview of the state of the art in the psychology and philosophy of rationality. Written by leading experts from both disciplines, *The Handbook of Rationality* covers the main normative and descriptive theories of rationality—how people ought to think, how they actually think, and why we often deviate from what we can call rational. It also offers insights from other fields such as artificial intelligence, economics, the social sciences, and cognitive neuroscience.

'*The Handbook* proposes a novel classification system for researchers in human rationality, and it creates new connections between rationality research in philosophy, psychology, and other disciplines. Following the basic distinction between theoretical and practical rationality, the book first considers the theoretical side, including normative and descriptive theories of logical, probabilistic, causal, and defeasible reasoning. It then turns to the practical side, discussing topics such as decision making, bounded

rationality, game theory, deontic and legal reasoning, and the relation between rationality and morality. Finally, it covers topics that arise in both theoretical and practical rationality, including visual and spatial thinking, scientific rationality, how children learn to reason rationally, and the connection between intelligence and rationality.' (From the Publisher)

More information available [here](#).

Kornblith, H. (2022). *Scientific Epistemology: An Introduction*. Oxford, UK: Oxford University Press. ISBN: 978-0-197-60956-9

'Epistemology has traditionally been motivated by a desire to respond to skeptical challenges. The skeptic presents an argument for the view that knowledge is impossible, and the theorist of knowledge is called upon to explain why we should think, contrary to the skeptic, that it is genuinely possible to gain knowledge. Traditional theories of knowledge offer responses to the skeptic which fail to draw on the resources of the sciences. This is no simple oversight; there are principled reasons why such resources are thought to be unavailable to the theorist of knowledge.

'This book takes a different approach. After arguing that appeals to science are not illegitimate in responding to skepticism, this book shows how the sciences offer an illuminating perspective on traditional questions about the nature and possibility of knowledge. This book serves as an introduction to a scientifically informed approach to the theory of knowledge. This book is a vital resource for students and scholars interested in epistemology and its connections to recent development in cognitive science.' (From the publisher)

More information available [here](#).

Mattingly, J. (2021). *Information and Experimental Knowledge*. Chicago, IL: Chicago University Press. ISBN: 978-0-226-80481-1

'What is experimental knowledge, and how do we get it? While there is general agreement that experiment is a crucial source of scientific knowledge, how experiment generates that knowledge is far more contentious. In this book, philosopher of science James Mattingly explains how experiments function. Specifically, he discusses what it is about experimental practice that transforms observations of what may be very localized, particular, isolated systems into what may be global, general, integrated empirical knowledge. Mattingly argues that the purpose of experimentation is the same as the purpose of any other knowledge-generating enterprise—to change the state of information of the knower. This trivial-seeming point has a non-trivial consequence: to understand a knowledge-generating enterprise, we should follow the flow of information. Therefore, the account of experimental knowledge Mattingly provides is based on understanding how information flows in experiments: what facilitates that flow, what hinders it, and what characteristics allow it to flow from system to system, into the heads of researchers, and finally into our store of scientific knowledge.' (From the Publisher)

More information available [here](#).

McOuat, G., & Stewart, L. (Eds.) (2021). *Spaces of Enlightenment Science*. Leiden: Brill. ISBN: 978-9-004-50122-5

'Where did we do science in the Enlightenment and why? This volume brings together leading historians of Early Modern science to explore the places, spaces, and exchanges of Enlightenment knowledge production. Adding to our understanding of the

‘geographies of knowledge’, it examines the relationship between ‘space’ and ‘place’, institutions, ‘objects’, and ‘ideas’, showing the ways in which the location of science really matters.

‘Contributors are Robert Iliffe, Victor Boantza, Margaret Carlyle, Jasmine Kilburn-Toppin, Trevor H. Levere, Alice Marples, Gordon McOuat, Larry Stewart, Marie Thébaud-Sorger, and Simon Werrett.’ (From the Publisher)

More information available [here](#).

Morris, P.J.T., & Rocke, A. (Eds.) (2021). *A Cultural History of Chemistry* (Volumes 1-6). London, UK: Bloomsbury. ISBN: 978-1-474-29492-8

‘From prehistoric metal extraction to medieval alchemy to modern industry, chemistry has been central to our understanding and use of the physical world as well as to trade, warfare and medicine. In its turn, chemistry has been shaped by changing technologies, institutions and cultural beliefs. *A Cultural History of Chemistry* presents the first detailed and authoritative survey from antiquity to today, focusing on the West but integrating key developments in Egypt, Mesopotamia, and the Arabic-Islamic and Byzantine empires.

‘Chapter titles are identical across each of the volumes. This gives the choice of reading about a specific period in one of the volumes, or following a theme across history by reading the relevant chapter in each of the six. The themes (and chapter titles) are: Theory and Concepts; Practice and Experiment; Sites and Technology; Culture and Knowledge; Society and Environment; Trade and Industry; Learning and Institutions; Art and Representation.

‘The six volumes cover: 1 – Antiquity (3,000 BCE to 600 CE); 2 – Medieval Age (600 to 1500); 3 – Early Modern (1500 to 1700); 4 – Eighteenth Century (1700 to 1815); 5 – Nineteenth Century (1815

to 1914); 6 – Modern Age (1914 to the Present).’ (From the Publisher)

More information available [here](#).

Narayanamurti, V., and Tsao, J. Y. (2021). *The Genesis of Technoscientific Revolutions: Rethinking the Nature and Nurture of Research*. Harvard, MA: Harvard University Press.

ISBN: 978-0-674-25185-4

‘Research is a deeply human endeavor that must be nurtured to achieve its full potential. As with tending a garden, care must be taken to organize, plant, feed, and weed—and the manner in which this nurturing is done must be consistent with the nature of what is being nurtured.

‘In *The Genesis of Technoscientific Revolutions*, Venkatesh Narayanamurti and Jeffrey Tsao propose a new and holistic system, a rethinking of the nature and nurturing of research. They share lessons from their vast research experience in the physical sciences and engineering, as well as from perspectives drawn from the history and philosophy of science and technology, research policy and management, and the evolutionary biological, complexity, physical, and economic sciences.

‘Narayanamurti and Tsao argue that research is a recursive, reciprocal process at many levels: between science and technology; between questions and answer finding; and between the consolidation and challenging of conventional wisdom. These fundamental aspects of the nature of research should be reflected in how it is nurtured. ‘To that end, Narayanamurti and Tsao propose aligning organization, funding, and governance with research; embracing a culture of holistic technoscientific exploration; and instructing people with care and accountability.’ (From the publisher)

More information available [here](#).

Pavuk, A. (2021). *Respectably Catholic and Scientific: Evolution and Birth Control between the World Wars*. Washington, DC: The Catholic University of America Press.

ISBN: 978-0-813-23431-1

*'Respectably Catholic and Scientific* traces the unexpected manner in which several influential liberal-progressive Catholics tried to shape how evolution and birth control were framed and debated in the public square in the era between the World Wars—and the unintended consequences of their efforts.

'A small but influential cadre of Catholic priests professionally trained in social sciences, Frs. John Montgomery Cooper, John A. Ryan, and John A. O'Brien, gained a hearing from mainline public intellectuals largely by engaging in dialogue on these topics using the lingua franca of the age, science, to the near exclusion of religious argumentation.

'The Catholics' approach was more than just tactical. It also derived from the subtle influence of Catholic theological Modernism, with its strong enthusiasm for science, and from an inclination toward scientism inherited from the Progressive Era's social science milieu.

'All three shared a fervent desire to translate the Catholic ethos, as they understood it, into the vocabulary of the modern age while circumventing anti-Catholic attitudes in the process. However, their method resulted in a series of unintended consequences whereby their arguments were not infrequently co-opted and used against both them and the institutional church they served.

'Alexander Pavuk considers the complex role of both liberal religious figures and scientific elites in evolution and birth control discourse, and how each contributed in unexpected ways to the reconstruction of those topics in public culture. The reconstruction saw the topics themselves shift from matters considered largely within moral frameworks

into bodies of knowledge and practice ripe for controlled scientific planning in movements ranging from birth regulation advocacy and social hygiene to eugenics.' (From the Publisher)

More information available [here](#).

Plotnick, R. (2022). *Explorers of Deep Time: Paleontologists and the History of Life*. New York, NY: Columbia University Press.

ISBN: 978-0-231-19534-8

'Paleontology is one of the most visible yet most misunderstood fields of science. Children dream of becoming paleontologists when they grow up. Museum visitors flock to exhibits on dinosaurs and other prehistoric animals. The media reports on fossil discoveries and new clues to mass extinctions. Nonetheless, misconceptions abound: paleontologists are assumed only to be interested in dinosaurs, and they are all too often imagined as bearded white men in battered cowboy hats.

'Roy Plotnick provides a behind-the-scenes look at paleontology as it exists today in all its complexity. He explores the field's aims, methods, and possibilities, with an emphasis on the compelling personal stories of the scientists who have made it a career. Paleontologists study the entire history of life on Earth; they do not only use hammers and chisels to unearth fossils but are just as likely to work with cutting-edge computing technology. Plotnick presents the big questions about life's history that drive paleontological research and shows why knowledge of Earth's past is essential to understanding present-day environmental crises. He introduces readers to the diverse group of people of all genders, races, and international backgrounds who make up the twenty-first-century paleontology community, foregrounding their perspectives and firsthand narratives. He also frankly discusses the many challenges that face the profession, with key

takeaways for aspiring scientists. Candid and comprehensive, *Explorers of Deep Time* is essential reading for anyone curious about the everyday work of real-life paleontologists.’ (From the publisher)

More information available [here](#).

Sider, T. (2022). *The Tools of Metaphysics and the Metaphysics of Science* [New in Paperback] Oxford, UK: Oxford University Press.

ISBN: 978-0-192-86476-5

‘Metaphysics is sensitive to the conceptual tools we choose to articulate metaphysical problems. Those tools are a lens through which we view metaphysical problems, and the same problems will look different when we change the lens. In this book, Theodore Sider identifies how the shift from modal to ‘post-modal’ conceptual tools in recent years has affected the metaphysics of science and mathematics. He highlights, for instance, how the increased consideration of concepts of ground, essence, and fundamentality has transformed the debate over structuralism in many ways. Sider then examines three structuralist positions through a postmodal lens. First, nomic essentialism, which says that scientific properties are secondary and lawlike relationships among them are primary. Second, structuralism about individuals, a general position of which mathematical structuralism and structural realism are instances, which says that scientific and mathematical objects are secondary and the pattern of relations among them is primary. And third, comparativism about quantities, which says that particular values of scientific quantities, such as having exactly 1000g mass, are secondary, and quantitative relations, such as being-twice-as-massive-as, are primary. Sider concludes these discussions by considering the meta-question of when theories are equivalent and how that impacts the debate over structuralism.’ (From the Publisher)

More information available [here](#).

Taillant. J. D. (2022). *Meltdown: The Earth Without Glaciers*. Oxford, UK: Oxford University Press. ISBN: 978-0-190-08032-7

‘Glaciers are built and destroyed during ice ages and interglacial periods. These massive ice bodies hold three quarters of our freshwater, yet we don’t have laws to protect them from climate change. When they melt, they increase sea levels, alter the Earth’s reflectivity, wreak havoc for ocean and air currents, destabilise global ecosystems, warm our climate, and bring on floods that swamp millions of acres of coastal land. The critical ecological role they play to keep our global climate stable, and the environmental functions they provide, wither. And, as climate change warms glacier cores, collapsing glacier ice triggers tsunamis that send deadly massive ice blocks, rocks, earth, and billions of liters of water rushing down mountain valleys. It has happened before in the Himalayas, the Central Andes, the Rockies and Western Cascades, and the European Alps, and it will happen again.

‘In his new book *Meltdown*, Jorge Daniel Taillant takes readers deeper into the cryosphere, connecting the dots between climate change, glacier melt, and the impacts that receding glacier ice brings to liveability on Earth, to our environments, and to our communities. Taillant walks us through the little-known realm of the periglacial environment, a world of invisible subsurface rock glaciers that will outlive exposed glaciers as climate change destroys surface ice. He also looks at actions that can help stop climate change and save glaciers, exploring how society, politics, and our leaders have responded to address the global COVID-19 pandemic and yet largely continue to fail to address the even larger—looming and escalating—crisis of climate change.

‘Our climate is deteriorating at a drastic rate, and it’s happening right in front of us. *Meltdown* is about



glaciers and their unfolding demise during one of the most critical moments of our planet's geological history. If we can reconsider glaciers in a whole new light and understand the critical role they play in our own sustainability, we may be able to save the cryosphere.' (From the publisher)

More information available [here](#).

Wallace, M. F. G., Bazzul, J., Higgins, M., & Tolbert, S. (Eds.) (2022). *Reimagining Science Education in the Anthropocene*. London: Palgrave. ISBN: 978-3-030-79624-2 [open access]

'This open access edited volume invites transdisciplinary scholars to re-vision science education in the era of the Anthropocene. The collection assembles the works of educators from many walks of life and areas of practice together to help reorient science education toward the problems and peculiarities associated with the geologic times many call the Anthropocene. It has become evident that science education—the way it is currently institutionalised in various forms of school science, government policy, classroom practice, educational research, and public/private research laboratories—is ill-equipped and ill-conceived to deal with the expansive and urgent contexts of the Anthropocene. Paying homage to myopic knowledge systems, rigid state education directives, and academic-professional communities intent on reproducing the same practices, knowledges, and relationships that have endangered our shared world and shared presents/presence is misdirected. This volume brings together diverse scholars to reimagine the field in times of precarity.'

'Situated in the era of the Anthropocene, this book volume recognises the political urgency of re-envisioning science education with and for the community while dismantling the taken-for-granted deficit narratives of what science [educa-

tion] is. Transcending disciplinary and geographical boundaries, the book calls us to reimagine science education in a more-than-human world, which places ecojustice, critical pedagogies, solidarity, and collectivity at the forefront.' — Lucy Avraamidou, Associate Professor and Rosalind Franklin Fellow, University of Groningen, The Netherlands

'This inspiring collection showcases the kind of creative thinking-without-borders we would need to prepare our students to meet the challenges of the Anthropocene. It makes me wish I were back in grad school to begin my research career afresh with the help of the wonderful assortment of ideas, insights, and perspectives that this book so generously offers.' — Ajay Sharma, Associate Professor, University of Georgia, USA

More information available [here](#).

Zwart, H. (2022). *Continental Philosophy of Technoscience*. London: Palgrave. ISBN: 978-3-030-84572-8 [open access]

'The key objective of this volume is to allow philosophy students and early-stage researchers to become practicing philosophers in technoscientific settings. Zwart focuses on the methodological issue of how to practice continental philosophy of technoscience today.

'This text draws upon continental authors such as Hegel, Engels, Heidegger, Bachelard and Lacan (and their fields of dialectics, phenomenology and psychoanalysis) in developing a coherent message around the technicity of science or rather, 'technoscience'. Within technoscience, the focus will be on recent developments in life sciences research, such as genomics, post-genomics, synthetic biology and global ecology. This book uniquely presents continental perspectives that tend to be underrepresented in mainstream philosophy of science, yet entail crucial insights for coming to terms with technoscience

as it is evolving on a global scale today.' ( From the publisher)

More information available [here](#).

## Coming HPS&ST Related Conferences

March 27-30, 2022, NARST Annual Conference, Vancouver, BC

Details: [here](#).

July 3rd-7th, 2022, IHPST 16th International Conference, University of Calgary, Canada

Details from Glenn Dolph:in:

[glenn.dolphin@ucalgary.ca](mailto:glenn.dolphin@ucalgary.ca).

July 18-22, 2022, 'Objects of Understanding: Historical Perspectives on Material Artefacts in Science Education', Europa-Universität Flensburg, Germany

Details: Roland Wittje, [roland.wittje@gmail.com](mailto:roland.wittje@gmail.com) and [here](#).

July 24-29, 2023, 17th DLMPST Congress, University of Buenos Aires

Information: Pablo Lorenzano, [pablo@unq.edu.ar](mailto: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](#).

HPS&ST-related organisations wishing their web page to be added to the list should contact assistant editor Paulo Maurício ([paulo.asterix@gmail.com](mailto:paulo.asterix@gmail.com))

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The NEWSLETTER is typeset in XeLaTeX.

The font is Minion Pro.

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