Actas del IX Congreso de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España

Madrid, 13–16 de noviembre de 2018

Proceedings of the IX Conference of the Spanish Society of Logic, Methodology and Philosophy of Science

Madrid, 13–16 November 2018

Editado por:
Cristian Saborido (UNED)
Sergi Oms (U. de Barcelona)
Javier González de Prado (UNED / U. Nova de Lisboa)

Actas del IX Congreso de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España

Madrid, 13–16 de noviembre de 2018

Proceedings of the IX Conference of the Spanish Society of Logic, Methodology and Philosophy of Science

Madrid, 13–16 November 2018

Editado por:

Cristian Saborido (UNED)
Sergi Oms (U. de Barcelona)
Javier González de Prado (UNED / U. Nova de Lisboa)

Maquetación: José Ángel Gascón

Imagen de portada: Cristina Zafra

ISBN: 978-84-09-06054-2

Comité organizador
Cristian Saborido (Chair, UNED)
Giorgio Airoldi (UNED)
Clara Bueno (UNED)
Emilio Cáceres (UNED)
Jose Ángel Gascón (UCSC, Chile)
Javier Gonzalez de Prado (UNED / U. Nova de Lisboa)
María Jimenez Buedo (UNED)
Lorena Lobo (U. Isabel I)
Victor Luque (U. de Valencia)
Laura Menatti (U. Bordeaux)
Vanessa Triviño (U. Rey Juan Carlos)
Sergi Oms (U. de Barcelona)
Cristina Villegas (U. Complutense de Madrid)

Comité del programa
Concepción Martínez Vidal (U. de Santiago de Compostela)
Antonio Blanco (U. Complutense de Madrid)
María Caamaño (U. de Valladolid)
Maria Cerezo (U. de Murcia)
José Martínez (U. de Barcelona)
Fernando Soler (U. Sevilla)
Inmaculada Perdomo (U. de la Laguna)

Instituciones patrocinadoras:

UNED Departamento Lógica, Historia y Filosofía de la Ciencia

UNED Facultad de Filosofía

Fundación Uned

Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España

DLMPST
International Union of History and Philosophy of Science and Technology
Division of Logic, Methodology and Philosophy of Science and Technology

Índice general

Prefacio XII

Premio para Jóvenes Investigadores XIV

Lullius Lectures 2018: Nancy Cartwright
Mid-level theory: Without it what could anyone do? 1

Lógica, Historia y Filosofía de la Lógica, y Argumentación **2**

1 **Baptista Santos, Gonçalo**
An intuitionistic understanding of unrestricted quantifiers 3

2 **Barés Gómez, Cristina y Fontaine, Matthieu**
Razonamiento experimental e inferencia en la práctica médica 6

3 **Berkovski, Sandy**
Imperatives and to-do lists: three objections 9

4 **Bertran San Millán, Joan**
Frege's adoption of the distinction between concept and object 16

5 **Carrara, Massimiliano y Lando, Giorgio**
Contingent composition as identity 19

6 **Domínguez Armas, Álvaro**
La argumentación en torno a la desobediencia civil 23

7 **Fernandes, Diego**
Expressiveness comparisons between logics: an investigation of some intuitions and formal criteria 26

8 **Grimau, Berta**
Cat, cats, catses and beyond: In defence of higher-level plural logic 33

9 **Herrera González, José Rafael**
Las lógicas híbridas como herramienta formal para el desarrollo de sistemas lógicos temporal-epistémicos 35

10 **Martin, Ben**
Identifying logical evidence 42

11 **Martínez Fabregat, Silvia**
Instagram y la pereza argumentativa 45

12 **Michon, Marie**
Emotions without language. The case of infants and animals 48

13 **Moreno Gómez, Manuel Crescencio**
Existence as a property of intensions 53

14 **Moreno Zurita, Alba**
Expressivism: the Frege-Geach problems and new goals 56

15 **Orellana Viñambres, David**
La lógica del siglo XIX desde la perspectiva de Edmund Husserl y su fenomenología 59

16 **Pascual, Carmen**
Déficit de conocimientos médicos y no fallos en las estrategias de razonamiento como principales responsables de los errores diagnósticos 63

17 **Sánchez Ovcharov, Carmen y Gherab Martín, Karim**
Lógica y razonamiento no lingüísticos: el ejemplo de los gráficos existenciales de Ch. S. Peirce 66

18 **Sforza Fogliani, Maria Paola**
Revising logic: Anti-exceptionalism and circularity 72

19 **Viejo, José Manuel**
Referencia directa, inocencia semántica y opacidad 75

20 **Wójtowicz, Anna y Wójtowicz, Krzysztof**
A stochastic process explanation of conditionals 83

Filosofía del Lenguaje **87**

21 **Agolli, Eno**
The Russell, the John, and the Katherine: The-defenders of the-Predicativism 88

22 **Alhambra Delgado, José**
Actos de habla y estatus social. Cómo el lenguaje puede convertirse en un estigma 90

23 **Almagro, Manuel y Torices, José R.**
The nature of (covert) dogwhistles 93

24 **Bordonaba, David y Villanueva, Neftalí**
Crossed disagreements: A quantitative and qualitative study on the minutes of the sessions of the Spanish Parliament 101

25 **Campdelacreu, Marta**
The difficulty of finding a commonsense answer to the special composition question 109

26 **Chilovi, Samuele y Wodak, Daniel**
The is-ought gap and the grounds of normative facts 112

27 **Cortés-Aravena, Juan Esteban**
Human deductive reasoning: Conditional perfection and mental models theory 114

28 **de Pinedo-García, Manuel y Villanueva-Fernández, Neftalí**
Power to the people. The indispensable nature of the normative vocabulary and the political turn in analytic philosophy 122

29 **Fairhurst, Jordi**
Slurs and the semantic-pragmatic divide 125

30 **Fernández, Ainhoa**
Act-based propositions and a posteriori necessity: Linguistic meaning for modes of presentation 130

31 **Fernández Moreno, Luis**
Causal theory and reference borrowing 138

32 **Lanius, David**
The value of vagueness 144

33 **Macià, Josep**
A defense of the common ground view about assertion 148

34 **Navarro-Laespada, Llanos y Frápolli, María José**
Inferentialism, representationalism and moral responsability 151

35 **Polo, Nuria**
La representación mental del sonido: ¿formalismo lingüístico o realidad cognitiva? 154

36 **Rivas Monroy, Mª Uxía**
"La aproximación fácil" a la ontología de Amie L. Thomasson: pragmática y pragmatismo entrelazados 157

37 **Soria Ruiz, Andrés**
The dynamics of value ascription 163

38 **Vilanova Arias, Javier**
El sentido común y la filosofía del lenguaje informal 165

Filosofía de la Mente y Epistemología **171**

39 **Andrada de Gregorio, Gloria**
The extension of cognitive abilities 172

40 **Barba Magdalena, Moisés**
El fiabilismo y la justificación de las creencias colectivas 175

41 **Blanco, Julia**
The bounds of agency: a review of the group person possibility 181

42 **Cabrera Miquel, Marta**
The role of emotions in philosophical explanations of intentional action 183

43 **de Donato Rodríguez, Xavier y Falguera, José L.**
A neo-Carnapian ontological commitment for science 185

44 **Duarte Calvo, Antonio**
Musement *o la actividad de la* red neural por defecto 192

45 **Espinosa López, Jorge Alejandro**
Hacia una noción de verdad compatible con un pluralismo genuinamente pragmatista o pluralismo radical 199

46 **Fernández Prat, Olga y Quesada, Daniel**
The experience and processing of temporal features of perception 207

47 **Filomeno, Aldo**
Qué es racional creer sobre las leyes Humeanas a la luz de la objeción de la coincidencia cósmica 214

48 **Garrido Rodríguez, Natividad y Liz Gutiérrez, Manuel**
Creación literaria y construcción de espacios de perspectivas 223

49 **Hernández-Conde, José V.**
Cuando los conceptos son no-persistentes y no-representacionales: Un examen contextualista-consistente de la mente 226

50 **Ibarrondo Murguialday, Julen**
Ser racional no equivale a responder correctamente a razones: el caso de las intenciones contradictorias 230

51 **Liz, Manuel y Vázquez, Margarita**
Razonamientos que involucran perspectivas 236

52 **Morales Carbonell, Felipe**
On the question of the indispensability of modal thought 243

53 **Navarro, Jesús**
Fake knowledge-how 248

54 **Pérez Otero, Manuel**
Relevancia epistémica de las intuiciones 251

55 **Pino, Dani**
Social virtues upside down: Group epistemic agents as sources for individual epistemic virtues 256

56 **Seoane Rodríguez, Pablo**
An hybrid ontology for musical works: Between perceptualism and epistemicism on musical understanding 260

57 **Serna, Edgar**
La discusión en torno al estatus epistémico de la doctrina filosófica del falibilismo 266

58 **Toribio, Josefa**
Implicit bias, accessibilism and justification 269

59 **Verdejo, Víctor M.**
Thinking and experiencing the embodied self 272

Filosofía y Metodología de la Ciencia **275**

60 **Akcin, Haktan**
What is really wrong with ontic structural realism? On the possibility of reading off ontology from current fundamental science 276

61 **Anta, Javier**
The explanatory power of topo-geometric diagrams in modern physics 279

62 **Atencia, Paula**
Scientific pluralism and scientific realism: Examining problems and reducing gaps 287

63 **Belastegui, Javier**
Kinds, joints and trees: The non-hierarchical structure of natural kinds 288

64 **Bich, Leonardo**
Operational definitions of life 290

65 **Buckareff, Andrei A.; Andrews, Marc y Brennan, Shane**
Contra *static dispositions* 292

66 **Cáceres Vázquez, Emilio**
La autoorganización como propiedad de nivel de sus entidades componentes 295

67 **Camprubí, Lino**
Varieties of pluralism and their ontological implications: The case of earth system sciences 302

68 **Corbalán, M. Inés y Terzian, Giulia**
Ockham's razor in a minimalist guise 304

69 **Corral-Villate, Amaia**
Analysis of the infinite gods paradox in classical particle mechanics. Representation of a causal problem 308

70 **Dziurosz-Serafinowicz, Patryk**
Justifying Lewis's kinematics of chance 311

71 **Findl, Johannes**
Knowledge vs understanding: Epistemic scenarios and scientific practice 314

72 **García Lapeña, Alfonso**
Truthlikeness for quantitative deterministic laws 317

73 **Henda Gómez de Segura, Mikel**
La teoría relacional del tiempo como teoría constructiva y su poder explicativo 325

74 **Hermida, Margarida**
Functional kinds as universal natural kinds in the life sciences 330

75 **Hernández, Abraham**
Más allá de Kitcher: la reformulación del contrato social de la ciencia 334

76 **Heylen, Jan y Tump, Lars**
The enhanced indispensability argument for Platonism and the circularity problem 337

77 **Krauss, Alexander**
How our mind enables and constrains the theories we develop 340

78 **Kvasz, Ladislav**
Patterns of theory change in physics 341

79 **Loaiza, Juan R.**
Can functionalism save emotions from elimination? 348

80 **Luque, Víctor J.**
Is there room for a new foundation for the force interpretation? 353

81 **Martínez-Vidal, Concha y Rivas de Castro, Navia**
The enhanced indispensability argument. Where are we? 357

82 **Militello, Guglielmo**
Structural and organisational conditions for machine-likeness 360

83 **Montojo, Carlos y García Valdecasas, Miguel**
Los mundos posibles de Lewis son entrópicos 362

84 **Ongay de Felipe, Íñigo**
The dappled world of evolutionary biology: Scientific pluralism and the extended evolutionary synthesis 365

85 **Pelacho, Maite**
Acciones y motivaciones para la constitución de lo común: Una propuesta desde la ciencia ciudadana 367

86 **Pinheiro, João**
The science of ethics & evolutionary moral realism 370

87 **Pogonowski, Jerzy**
Extremal axioms in mathematics 372

88 **Rivadulla, Andrés**
Theoretical innovation. A new look at creativity in the natural sciences 376

89 **Sánchez Ovcharov, Carmen**
Diagramatización en física: aproximación semiótica al alcance representativo de los diagramas de Feynman 384

90 **Sánchez-Dorado, Julia**
The creative similarity account of the means *of representation* 388

91 **Sánchez Gómez, Pedro J.**
A propensionist interpretation of Lewis structures 393

92 **San Pedro, Iñaki**
Computer simulations, emergence, and scientific representation 398

93 **Soler, Jaime**
Usefulness (or not) of defining the concept of life in biology 401

94 **Suárez, Javier**
Holobionts as units of selection: A trait-based account of holobiont individuality 405

95 **Suñé, Abel**
An account of fundamentality for the metaphysics of science 408

96 **Urueña López, Sergio**
Scientific realism beyond pessimistic induction: From truth to plausibility 411

97 **Vecchi, Davide y Casetta, Elena**
Probing geno-centric approaches to conservation biology 420

98 **Viñuela Villa, Pedro A.**
Kant and Wittgenstein on pictures and proofs in mathematics 423

99 **Wójtowicz, Krzysztof**
Metaabstract explanations in science 427

Ciencia, Tecnología y Sociedad **430**

100**Bernabeu, Cristina**
Predecir personas*: la opresión de género en los perfiles los* buyers *persona* 431

101**de Cózar Escalante, José Manuel**
Antropoceno y praxeología de la cultura científica 436

102**García-Barranquero, Pablo**
A new framework for thinking about life extension 441

103**García Díaz, Laura y Hernández Pérez, Abraham**
El papel de las series de televisión en la democratización de la ciencia 445

104**Perdomo, Inmaculada**
Socially responsible philosophy of science 448

105**Pérez Sedeño, Eulalia**
Biotecnología y maternidad por sustitución: ¿cosificación, mercantilización o altruismo de género? 452

106**Rivero, Thais**
Proyecto Isotipo: Hacia un lenguaje visual unificado 458

107**Torres González, Obdulia**
El desequilibrio de género en filosofía 461

108**Vázquez Campos, Margarita y García Díaz, Laura**
Puntos de vista y referencias temporales en una serie de televisión. El caso de "The affair" 468

109**Veit, Walter**
Enhancement technologies and inequality 471

Historia de la Ciencia **477**

110**Labrador Montero, Daniel**
Telos y especie biológica: la historia de dos conceptos inseparables 478

Taller sobre Nancy Cartwright **486**

111**Arruda, Renata**
Causal pluralism and the boundaries of manipulation 487

112**Bujalance, Laura**
In the beginning there were no laws of nature and now what is out there? On Nancy Cartwright's "dappled" causal explanations 490

113**Helding Vembye, Mikkel**
Reflecting on Nancy Cartwright's conception of external validity of Randomised Controlled Trials 494

Simposio: Issues at the intersection between metaphysics and biology 504

114**Introduction** 505

115**Austin, Christopher J.**
Form, cause, and explanation in biology: A neo-Aristotelian perspective 507

116**Bertolaso, Marta y Cerezo, María**
Development and cancer: Insights from teleology 509

117**Triviño, Vanesa**
Emergentism in a biological framework: The case of fitness 512

118**Villegas, Cristina y Nuño de la Rosa, Laura**
Chances and propensities in evo-devo 514

Simposio: La filosofía de la argumentación 517

119**Alcolea Banegas, Jesús**
Maniobras estratégicas y estrategias interpretativas en la argumentación 518

120**Galindo Castañeda, Joaquín**
Las preguntas "por qué" argumentativamente 525

121**Marraud, Hubert**
Usos asertivos, directivos y expresivos de argumentación 528

122**Moldovan, Andrei**
Presuposiciones, preguntas y falacias 535

123**Vega Reñón, Luis**
Una invitación a tomar con filosofía la argumentación 536

Simposio: La argumentación de la filosofía 543

124**Álvarez Álvarez, J. Francisco**
Argumentación y vigilancia epistémica en entornos digitales 544

125**Bermejo Luque, Lilian**
What is wrong with deductivism? 545

126**Corredor Lanas, Cristina**
Teoría de actos de habla y teoría de la argumentación 550

127**Gascón Salvador, José A.**
Cómo argumentar con coherencia 556

128**Olmos Gómez, Paula**
Releyendo a Kuhn desde la teoría de la argumentación 563

Simposio:
The genesis of geometric knowledge **571**

129**Ferreirós, José**
Introduction 572

130**de Paz, María**
The cognitive basis of Poincaré's philosophy of geometry 573

131**Ferreirós, José**
Mathematics and cognitive science: The case of geometry 575

132**García-Pérez, Manuel Jesús**
The prehistorical roots of geometry: an overview 578

Simposio:
Biological inter-identities **581**

133**Etxeberria Agiriano, Arantza y Ruiz-Mirazo, Kepa**
Introduction 582

134**Arnellos, Argyris**
Collaboration and biological individuality 584

135**Bich, Leonardo y Frick, Ramiro**
An organisational framework for the synthetic modeling of biological communication 586

136**Etxeberria, Arantza y Nuño de la Rosa, Laura**
Biological individuality and reproduction: Intermittent interidentity in the evolution of pregnancy 588

137**Ruiz-Mirazo, Kepa; Shirt-Ediss, Ben y Moreno, Álvaro**
The construction of biological 'inter-identity' as the outcome of a complex process of prebiotic evolutionary development 590

138**Umerez, Jon y Ferreira, M. J.**
Biological individuality and reproduction: Intermittent interidentity in the evolution of pregnancy 592

Simposio:
Evidencia científica y regulación: alimentos y fármacos **595**

139**Introducción** 596

140**Cámara Hurtado, Montaña**
Health claims. La frontera entre alimento y medicamento 597

141**Luján, José Luis y Bengoetxea, Juan Bautista**
Estándares de prueba y valores no cognitivos en la ciencia reguladora: el caso de las declaraciones de salud 598

142**Tempini, Niccolo y Teira, David**
Los registros electrónicos sanitarios como evidencia regulatoria 599

143**Todt, Oliver y Sanz, Noemí**
La regulación de las declaraciones de salud y el debate público 600

Simposio:
The bodily self **602**

144**Palmira, Michele y Verdejo, Víctor M.**
Introduction 603

145**de Vignemont, Frédérique**
The phenomenal contrast of ownership 605

146**Salje, Léa**
The inside-out binding problem 607

147**Serrahima, Carlota**
Ownership and immunity 608

Prefacio

En este volumen se recogen las actas de las comunicaciones presentadas al IX Congreso de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España, celebrado los días del 13 al 16 de noviembre de 2018 en la Facultad de Filosofía de la sede central de la UNED, en Madrid.

Los congresos de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España se celebran cada tres años en una ciudad diferente y constituyen la reunión científica más longeva, multitudinaria e influyente en estos ámbitos en nuestro país. Estos congresos se llevan a cabo en colaboración entre la SLMFCE (`http://www.solofici.org/`) y la universidad anfitriona de cada edición. Tienen como objetivo el fomento, la divulgación y la promoción de los estudios e investigaciones en Lógica, Metodología de la Ciencia, Filosofía de la Ciencia y sus disciplinas afines, así como la interrelación con los diferentes especialistas y Sociedades e Instituciones científicas, nacionales e internacionales, interesadas en estos campos científicos. El congreso tuvo además una dimensión marcadamente internacional. El formato de las comunicaciones y ponencias fue multilingüe y muchos de los participantes provienen de universidades extranjeras.

En esta ocasión, el congreso celebrado en la UNED consiguió reunir a una gran cantidad de expertos en las áreas de investigación abordadas por la SLMFCE. En total, se recibieron 222 propuestas, entre comunicaciones y simposios, respondiendo a la llamada a la participación lanzada por los organizadores del congreso. Tras un arduo proceso de evaluación ciega dirigido por los prestigiosos miembros del comité científico, se aceptaron finalmente 178 trabajos, entre comunicaciones individuales repartidas en mesas temáticas y las agrupadas en ocho simposios dedicados a cuestiones específicas.

Además, en cada edición del congreso se celebran las conocidas "Conferencias Lullius", en las cuales un reconocido experto ofrece tres conferencias plenarias. Estas conferencias fueron inauguradas por Philip Kitcher en 2012 en Santiago de Compostela y en 2015 en Barcelona fue Hartry Field el galardonado con este reconocimiento. En esta ocasión, fue la prestigiosa profesora Nancy Cartwright, de la universidad de Durham y la Universidad de California en San Diego (`http://www.profnancycartwright.com/`), quién impartió estas tres conferencias.

Se debe señalar asimismo que hubo una sesión de "Encuentro con los editores", organizada por la revista *Theoria*. También se celebró una sesión dedicada a la profesora Amparo Gómez, que lamentablemente nos dejó recientemente y a quien sus compañeros pudimos homenajear en el congreso.

El IX Congreso de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia tuvo además un decidido compromiso en la promoción del trabajo de los investigadores más jóvenes. Prueba de esto es que se otorgaron dos premios de 500 euros cada uno a las mejores ponencias presentadas por estudiantes o recientes doctores.

Los organizadores de este congreso agradecemos la participación de todos los comunicantes, así como la ayuda de la Sociedad de Lógica, Metodología y Filosofía de la Ciencia en España, la Facultad de Filosofía y el Departamento de Lógica, Historia y Filosofía de la Ciencia de la UNED, quienes proporcionaron los medios, humanos y materiales, necesarios para que este evento pudiera tener lugar. Además, este congreso estuvo enmarcado en los eventos auspiciados por la *International Union of History and Philosophy of Science and Technology*. Y, por supuesto, no podemos dejar de expresar nuestro reconocimiento a todos los miembros del Comité Científico, el Comité de Programa y el Comité Organizador Local, sin cuya colaboración nada de esto hubiera sido posible.

La primera edición de los congresos de la SLMFCE se celebró precisamente en la Universidad Complutense de Madrid y en la UNED en el año 1994. Hoy, tras 24 años y 8 ediciones, podemos decir con orgullo que este congreso ha vuelto a su primera casa y que lo hace exhibiendo un reconocimiento académico y unos niveles de calidad indiscutibles, tal y como demuestran los excelentes trabajos que se presentan en estas actas.

Cristian Saborido (UNED)
Javier González de Prado (UNED / U. Nova de Lisboa)
Sergi Oms (U. de Barcelona)

Socially responsible philosophy of science

Inmaculada Perdomo[1]
University of La Laguna
mperdomo@ull.es

Science, directed at the achievement of collective goals, fulfils the principal aim of responding to relevant and significant questions (Kitcher 2001; van Fraassen, 2008). But these questions are dependent upon context and decidable within the framework of democratic societies. Traditional efforts to design a notion of epistemic significance independent of contextual restrictions, free from social and moral values, and demanding that the obtaining of epistemically significant truths is valuable in principle, is an undertaking impossible: moral and social values are inherent to scientific practice. Nor is it possible to defend the idea that all sciences can be unified in a hierarchical chain, or the vision that the integration of all theoretical proposals in a unified scheme is the essence of the objective understanding of our world. In fact, the image of a patchwork of theories, laws and disciplines without a hierarchical order or systematic relationship defended by N. Cartwright (1999) seems a more appropriate vision of the structure of science.

Social epistemology has turned its attention away from the question: how do we know? and now focuses instead on the question of the goals and results of science: what do we know and what do we not know, and why? The basic questions now are: who is science for? How does the fact that some people are excluded from science influence our knowledge? Which projects and goals are pursued and which ignored? Which experiences are considered valid or adequate and which are not? It is precisely these types of decisions that, to a large extent, make up the practice of science and which, finally, define the problems deemed relevant and the type of solutions deemed acceptable. Once a problem has been defined, just one response may be the most appropriate solution, but the problem could have been defined in a different way, and perhaps even other problems may have been identified as more relevant. From this point of view, Kitcher's arguments and thoughts regarding the possibility of a *well-ordered* science and the conditions under which such a science would be possible in the heart of democratic societies are extremely suggestive.

In my opinion, the question of *democratic science* is posed transversally in the reflection on science and enables us to identify three areas of analysis:

[1]Inmaculada Perdomo, PhD in Philosophy of Science and Professor of the Area of Logic and Philosophy of Science, Faculty of Humanities, ULL. Director of the Research Institute of Gender and Women Studies at the University of La Laguna. She is part of the team that develops the research project: "Justice, Citizenship and Vulnerability: Narratives of precariousness and intersectional approaches", FFI2015-63895-C2-1-R IP: María José Guerra y Eva Darias (2016- 2018)

a. That related to *theory contents*.

b. That related to the *practice of science*.

c. That related to the *goals and directions of science*.

With regard to the first point, many interesting works by feminist science critics, which focus on warning about the biases present in scientific contents, mainly in biomedical theories, share this concern. With regard to the second, as an example, Feminist epistemology had explored the processes and activities of social construction of knowledge concluding that the subject is plural but women are not in the center of that process, their voices are devaluated and not authorized (Helen Longino, 2001). It is an epistemic injustice (Miranda Fricker, 2007), and political action must be considered to increase the number of women in STEAM areas, and the structures of science and academies must be changes in order to create a more democratic or inclusive decision-making processes (Londa Schiebinger, 2011).

The dynamics and gender asymmetries in career paths of women and men, and real evacuation of women from classrooms in relevant areas and professions must be also analized. As an example, this year we knew that Tokyo medical school altered test scores to keep women out. The University began to keep the percentage of women admitted each year to around 30 % of the incoming class. This had been done since 2010 when around 40 % of successful applicants were women. This is an explicit exclusion, but some other mechanisms must be observed.

Miranda Fricker's concepts (hermeneutical and testimonial injustices) explain these mechanisms of exclusion well, reaching the area of epistemology and ethics. Epistemic activity evaluated, not in ideal and abstract terms, but considering that it is carried out by socially situated individuals, in the highly relevant context of shaping our current techno-culture such as in education, profession and institutions. Inequalities and power issues associated with market dynamics form a highly competitive world displacing subjects defined as different i.e. women and others.

There are two basic epistemic practices that we need to consider to address Miranda Fricker's proposal. First, transmitting knowledge to others and secondly, to make sense of our own social experiences. Both types of epistemic practices involve social and discursive interactions so these interactions must be situated in the field of policies and ethics of epistemic practices. These mechanisms or types of *epistemic injustice* are at the root of the dynamics of exclusion of women from the center of shaping our current techno-culture, which produces, transmits and reiterates narratives of "authorized" subjects and make those of different subjects invisible. The myths and images that structure our visions of technology continue to transmit the image of men as authorized agents of scientific and technological development, and women as subjects not interested in it, or not as much capable as men.

Furthermore, in a clear reference to Helen Longino criteria for criticism in scientific communities, when members of certain groups are taken less seriously in the classroom, in the lab, at conference venues, and in the grant proposal process, one effect can be that the researcher does not receive the level of rigorous

criticism that might be required in order to strengthen their work or help them identify in what positive direction the work needs to be developed. This is too a participatory injustice, argues Grasswick (2017).

In the case of science, the significance of such participatory epistemic injustices is exacerbated because of the high degree of cognitive authority placed in the institutions of science. When society, as a whole, relies on and privileges the institutions of science to direct and produce knowledge that will have social relevance, the impact of participatory epistemic injustices that prevent or deter access to these communities of knowledge generation is more pronounced than in other areas of knowledge production (Grasswick 2017, 317).

And finally in relation to third point, Kitcher's analysis of democratic decision-making processes applied to science suggests several interesting dilemmas which may be posed in response to the questions: how should we decide democratically which research areas and projects should be funded? What goals should science obtain? What projects would contribute to the common good if put into practice? Firstly, what do we actually mean by "the common good": that which is beneficial to the citizens of modern, rich, western democracies or the ones that will benefit all humanity? This debate is plagued with dilemmas but the question of how we should make decisions about science in today's modern, democratic societies is closely linked to yet another question: how can we democratise decision-making processes in science?

The relevant question here is that the agents involved in this type of discussion are not only scientists; moreover, the decisions made only by scientists do not result in a *well-ordered science*, since the pressures of competitiveness may prompt them not to consider the interests of other individuals, the majority of human beings. In fact, it is precisely this overlooking of the interests of the vast majority of human beings that constitutes the starting point for the need of a *well-ordered science*. In that sense, the question: *what kinds of science should be done?* is crucial (Kitcher, 2011).

Scientific policies play a key role in the establishment of the goals and objectives, which science should strive to achieve. This is now a big problem for all the countries because of the risks associated to the climate change and the advances of Biotechnologies and promises of Transhumanism, and worries about the Posthumanist new era (R. Braidotti, 2013). Funding projects, establishing priority areas of research, making a commitment to applied or basic research and laying out selective research quality evaluation and assessment criteria, etc. are all ways in which science aims to achieve certain goals. This orientation necessarily involves the ignoring of other possible lines of action which may have otherwise been initiated or developed. In democratic contexts, scientific policies should pursue the *common good*. This notion becomes a central one, and as such, it also becomes a critical task of the philosophy of science, in all its plural trends, to warn of any "failures to comply with" or "deviations from" the main objective, namely, that of improving the living conditions of all human beings taking care of the all living beings and of our common house.

A final point must be included: Philosophy of science must deliver also an important social function: making the public more aware of the importance of science, promoting a critical and informed public opinion. Philosophers of scien-

ce could be considered as public intellectuals who speak up for science, and rectify common misconceptions or uninformed judgments that may feed into political lobbies, agendas and ultimately policy-making. Philosophy of science is an integral part of our public discourse on science. Recent public discourses of P. Kitcher or M. Massimi emphasize our responsibility to communicate the value of science to society at large. These all are crucial tasks for a socially responsible Philosophy of Science.

References

Braidotti, R. (2013). *The Posthuman*. Cambridge University Press.

Cartwright, N. (1999). *The Dappled World. A Study of the Boundaries of Science*. Cambridge University Press.

Graswick, H. (2017) in Kidd, Medina, Pohlhaus (eds.) *The Routledge Handbook of Epistemic Injustice*, Routledge, pp. 313–323.

Longino, H. (2001). *The Fate of Knowledge*. Princeton University Press.

Kitcher, P. (2001). *Science, Truth and Democracy*. Oxford University Press.

Kitcher, P. (2011). *Science in a Democratic Society*. Prometheus Books.

Kitcher, P., Fox Keller, E. (2017). *The Seasons Alter. How to save our planet in six acts*. Liveright Publishing Corporation.

Schiebinger, L. (2011). "Interdisciplinary Approaches to Achieving Gendered Innovations in Science, Medicine, and Engineering". *Interdisciplinary Science Reviews*, vol.36, n°2, 154–67.

Van Fraassen, B. (2008). *Scientific Representation. Paradoxes of Perspective*. Oxford University Press.