

Research Networking Programme

The Philosophy of Science in a European Perspective (PSE)



European Science Foundation (ESF)

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1. Introduction

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A long-lasting tradition of investigations into the foundations and nature of scientific knowledge took shape in Central Europe at the beginning of the last century. The tradition first involved Logical Empiricism in Vienna, Berlin and Prague, then went on to tackle a wide range of both empirical and formal disciplines, and soon produced an extensive and stimulating literature, setting the ground for a wide array of reflections on the structure of science, its aims and limits. After such a tremendous growth, the movement was dissolved towards the end of the 1930s with the takeover of Nazism, and its focus moved abroad, especially to the USA, where many of its exponents eventually settled. Since then, Europe has not been alone in setting the parameters for discourse in and about science, but the last few decades have seen a renewed interest in foundational and methodological issues by scholars Europe-wide, with an increasing awareness of the European roots in scientific enterprise and reflections on scientific knowledge.

Considering the methods and the foundations of science from a European perspective neither presupposes nor supports or encourages chauvinist claims of superiority, but merely expresses recognition of an undeniable historical contingency: European culture entered into the discourse of science from the very beginning. The ESF Research Networking Programme 'The Philosophy of Science in a European Perspective' (PSE) - which ran from May 2008 to April 2013 - has focused on the philosophy and foundations of the natural and social sciences, as well as on the history of philosophy of science. Its aim was to foster exchange among scholars from all over Europe, to build a network of strong and durable relations between individuals, academic institutions, and research centres. This

goal has been pursued from a strongly interdisciplinary and cross-disciplinary perspective and largely achieved by the organisation of a series of international workshops involving eminent European and non-European scholars and junior researchers. The conferences, which have involved both PSE and non-PSE members, addressed specific topics on a yearly basis and were widely attended by philosophers and natural and social scientists. Participants were offered the opportunity to present the latest results of their investigations, engage in extensive discussions and suggest new topics of interest and innovative lines of research. Ample time was given to scientific practice, previously neglected disciplines and their peculiar features, as well as future directions for the philosophy of science. The contributions delivered put forward a wide variety of applications and possible implications of philosophical insights on science. The latest conceptual frameworks were debated, new challenges suggested, and promising lines of research on a number of issues were outlined. The organisation of joint workshops bridged boundaries between different fields of investigation in the philosophy of science and stimulated original exchanges. Specific attention was also devoted to historical developments of the philosophy of science and its interactions with different cultural and scientific traditions.

PSE's scientific initiatives have been regularly posted on the Programme's website (www.pse-esf. org) and their results collected in the volumes of the series 'The Philosophy of Science in a European Perspective', published by Springer International. Four volumes have already come out, while a fifth is due to be published in 2014. In addition, two volumes originating from a joint IVC-PSE conference held in Vienna in 2011 will be published in Autumn



PSE-IVC joint conference, Vienna 2011. Photo courtesy of the Vienna Circle Institute.

2013. In line with the Programme's aim of encouraging a new generation of philosophers of science, published contributions include not only papers by some of the world's most renowned scholars, but also by many junior researchers.

In pursuing the enhancement of the European tradition and current research in the philosophy of science, PSE has worked closely with the European Philosophy of Science Association (EPSA). PSE organised a round table discussion entitled 'Philosophy of Science in Europe: Past, Present and Future' at the second EPSA conference, in Amsterdam in 2009, and a symposium on 'New Challenges for Philosophy of Science' at the third EPSA conference, in Athens in 2011. Furthermore, Professors Friedrich Stadler and Theo Kuipers, respectively President and Vice-President of EPSA, are both members of the PSE Steering Committee, and a number of PSE members are on the editorial board of the EPSA journal 'The European Journal for Philosophy of Science'. Collaboration between PSE and EPSA will also continue to flourish after the end of the Programme through, among others, a new EPSA-PSE series, planned as a joint effort and published by Springer International, as well as the PSE website, which will be linked to the EPSA website.

Remarkable contributions have been presented and disseminated by the Programme in all the fields addressed. PSE has emphasised the historical dimensions of scientific knowledge and philosophical reflections with an in-depth focus on the roots of conceptions elaborated within the philosophy of science as some of the distinctive features of a European approach to the discipline. The current worldwide scenario of philosophy of science is much better balanced than it was a few years ago, with

a highly significant range of research centres and projects, journals and book series, major publications and events taking place in Europe, with more visibility and greater impact. PSE played a prominent role in making philosophy of science far more European than it was at the time of its launching, and has paved the way for an even stronger European philosophical integration on the basis of a consolidated researching network.

2.

Programme Description

PSE was a natural development of two ESF Networks, 'Historical and Contemporary Perspectives of Philosophy of Science in Europe' (HCPPS, 2002-2004) and 'Philosophical and Foundational Problems of Modern Physics' (PFPMP, 2003-2005), which had pointed to major trends of research and their lacunae. Building on the results of two such successful Networks, PSE focused on foundational and methodological issues both in the natural sciences, such as physics, biology, chemistry, environmental and climate sciences, and in the social sciences and humanities, including sociology, economics, anthropology, political science, psychology and history. Special interest was devoted to emerging disciplines with a particular borderline status, such as medicine, archaeology, forensic science, information and cognitive sciences, and the sciences of the artificial.

The central aims of the Programme were:

- i. to favour an interdisciplinary approach in the study of the philosophy of science;
- to create a strong network among European scholars and Centres active in the field;
- 3. to provide an opportunity for young scholars to present their own research;
- 4. to publish a series of volumes bringing together the main contributions presented at conferences and workshops organised by the Programme.

PSE's activities focused on the following five main topics, which were addressed on a yearly basis:

- The present situation in the philosophy of science (1st year);
- Explanation, prediction and confirmation (2nd year);
- Probability and statistics (3rd year);

- The sciences that philosophy has neglected (4th year);
- New directions in the philosophy of science (5th year).

These topics were addressed by the five PSE Teams from different angles, according to their specificity (see the description and composition of Teams given below). This allowed PSE to cover practically all fields of the philosophy of science, and tackled all the most debated issues in that arena.



First Steering Committee meeting, Strasbourg 2008. Photo courtesy of Maria Carla Galavotti

PSE Steering Committee

- Maria Carla Galavotti (Chair) *University of Bologna, Italy*
- Miklos Redei (Co-Chair)

 London School of Economics, United Kingdom
- **Gereon Wolters** (Co-Chair) *University of Konstanz, Germany*
- Diderik Batens University of Ghent, Belgium
- Claude Debru École Normale Supérieure, Paris, France
- Javier Echeverria

Consejo Superior de Investigaciones Científicas (CSIC), Madrid; University of the Basque Country, Donostia-San Sebastian, Spain

- Michael Esfeld (2010-2013)

 University of Lausanne, Switzerland
- Jan Faye
 University of Copenhagen, Denmark
- Olav Gjelsvik University of Oslo, Norway
- Gerd Grasshoff (2008-2010) University of Bern, Switzerland
- Theo Kuipers University of Groningen, The Netherlands
- Ladislav Kvasz Comenius University, Bratislava, Slovakia
- Adrian Miroiu University of Bucharest, Romania
- Ilkka Niiniluoto University of Helsinki, Finland
- Tomasz Placek (from 2010) Jagiellonian University, Krakow, Poland
- Demetris Portides
 University of Cyprus, Nicosia, Cyprus

 Wlodek Babinowicz
- Wlodek Rabinowicz
 University of Lund, Sweden
- Friedrich Stadler
 University of Vienna, Austria
- Gregory Wheeler New University of Lisbon, Portugal

Teams and Topics

PSE included scholars from 22 countries and was structured into five teams of researchers, each focusing on a specific area in the philosophy of science. According to the year topic, the five teams, individually or jointly, were responsible for organising the workshops.

Team A: Formal Methods

The toolbox of modern logic has traditionally been used to clarify concepts such as scientific explanation, confirmation and inter-theoretic reduction. Despite their merits, it is widely recognised that purely logical accounts are not flexible enough to capture the details of actual scientific practice. A variety of formal methods are currently employed in the philosophy of science, complementing purely logical accounts, including Bayesian methods, combinations of logic and probability theory and various kinds of applied logic. Team A focused on the analysis of these methods and showed how they can be used to solve problems in science and illuminate episodes from the history of science.

• Team Leader: Stephan Hartmann

Ludwig Maximilian University of Munich, Germany (formerly: Tilburg University, The Netherlands)

- Team Co-leader: Thomas Müller Utrecht University, The Netherlands
- Team members:

Gabriella Crocco (University of Aix-en-Provence), Franz Dietrich (Paris Descartes University; formerly: London School of Economics, University of Maastricht), Igor Douven (University of Groningen; formerly: University of Leuven), Adam Grobler (Opole University), Vincent Hendricks (University of Copenhagen; formerly: Roskilde University), Franz Huber (University of Konstanz), Hannes Leitgeb (Ludwig Maximilian University of Munich; formerly: University of Bristol), Joke Meheus (University of Ghent), Gabriella Pigozzi (Paris Dauphine University; formerly: University of Luxembourg), Stathis Psillos (University of Athens), Jan-Willem Romeijn (University of Groningen), Jon Williamson (University of Kent)

Team B: Philosophy of the Natural and Life Sciences

Team B focused on a set of specific foundational and methodological issues arising in the life sciences and medicine, with a special focus on evolutionary biology and systematics, genomics and proteomics, cell and molecular biology, neurobiology, systems biology, and biomedical research. Team B was also concerned with cross-disciplinary comparisons within the natural sciences, with relations between the life sciences and the physical sciences, and with the status of chemistry.

- Team Leader: Marcel Weber University of Geneva, Switzerland (formerly: University of Konstanz, Germany)
- Team Co-leader: Hanne Andersen University of Aarhus, Denmark
- Team members:

Aristides Baltas (University of Athens), Raffaella Campaner (University of Bologna), Martin Carrier (University of Bielefeld), Mehmet Elgin (Mugla University), Anne Fagot (Collège de France), Jean Gayon (University of Paris I, Panthéon-Sorbonne), Paul Hoyningen-Huene (University of Hannover), Michael Joffe (Imperial College London), Peter McLaughlin (University of Heidelberg), Tim Lewens (University of Cambridge), Thomas Reydon (University of Hannover), Arno Wouters (Erasmus University Rotterdam; formerly: Utrecht University)

Team C: Philosophy of the Cultural and Social Sciences

Foundational and methodological debate has a central role in the building of the cultural and social sciences. It follows at least three different lines: i) the general scientific status of the social sciences, which calls attention to the different components of science, such as language, structure, knowledge, method, etc.; ii) the scientific status of the social sciences compared to that of the natural sciences; this includes methodological controversies such as Erklären-Verstehen and prediction-understanding; iii) the scientific status of each social discipline. Team C investigated these themes in depth.

- Team Leader: Wenceslao J. Gonzalez University of A Coruña, Spain
- Team Co-leader: Amparo Gomez University of La Laguna, Spain
- Team members:

Daniel Andler (University of Paris IV, Paris-Sorbonne), Marcel Boumans (University of Amsterdam), Paolo Garbolino (IUAV, Venice), Gerd Gigerenzer (Max Planck Institute for Human Development, Berlin), Bengt Hansson (University of Lund), Rainer Hegselmann (University of Bayreuth), Christian List (London School of Economics), Katarzyna Paprzycka (University of Warsaw), Arto Siitonen (University of Helsinki), Matti Sintonen (University of Helsinki), Wolfgang Spohn (University of Konstanz), Antonio Zilhao (University of Lisbon)

Team D: Philosophy of the Physical Sciences

Team D's main focus was on two related themes: probability in physics and the applications of ideas from physics to other fields. Probability is a central concept in both quantum theory and classical and quantum statistical mechanics. It is not only used in the practical application of these theories, but it is also central to the major conceptual issues surrounding them, namely the formulation of the quantum collapse postulate and thus the quantum measurement problem, and the arrow of time in statistical mechanics. Investigating these topics provided a direct line of attack on the main relationships between physics and other disciplines.

- Team Leader: Dennis Dieks Utrecht University, The Netherlands
- Team Co-leader: Guido Bacciagaluppi University of Aberdeen, United Kingdom
- Team members:

Anouk Barberousse (University of Paris I, Panthéon-Sorbonne), Jeremy Butterfield (University of Cambridge), Mauro Dorato

(University of Rome 3), Roman Frigg (London School of Economics), Holger Lyre (University of Magdeburg; formerly: University of Augsburg), F.A. Muller (Erasmus University Rotterdam; Utrecht University), László E. Szábó (Eötvös University, Budapest), Henrik Zinkernagel (University of Granada)

Team E: History of the Philosophy of Science

As in other fields of human endeavour, science possesses distinctive roots in the cultures to which its practitioners belong. Despite the intrinsic internationalism which determines its ethos of investigation and validation, the practice and content of science, its dissemination and reception are not only fixed by the conscious cognitive concerns of a free-floating scientific intelligentsia. They are also influenced by distinctive, long-standing philosophical traditions, quite separate from the practical exigencies faced by their host cultures. Moreover, science has shown uneven development over its history. Studying the history of foundational controversies, Team E brought into focus the distinctive reflections on the natural and social sciences in the European tradition and explored their bearing on contemporary debates.

- Team Leader: Thomas Uebel
 University of Manchester, United Kingdom
- Team Co-leader: Michael Stoeltzner
 University of South Carolina, Columbia, USA
 (formerly: University of Wuppertal, Germany)
- Team members:

Anastasios Brenner (University Paul-Valéry, Montpellier III), Cristina Chimisso (Open University, Milton Keynes), Massimo Ferrari (University of Turin), Michael Heidelberger (University of Tübingen), Gürol Irzik (Sabanci University, Istanbul; formerly: Boğaziçi University, Istanbul), Berna Kilinc (Boğaziçi University, Istanbul), Artur Koterski (Marie Curie-Sklodowska University, Lublin), Thomas Mormann (University of the Basque Country, Donostia-San Sebastian), Elisabeth Nemeth (University of Vienna), Graham Stevens (University of Manchester), Pierre Wagner (University of Paris I, Panthéon-Sorbonne)



Sixth Steering Committee meeting, Bertinoro 2012. Photo courtesy of Maria Carla Galavotti

Funding Organisations

- Austria: Austrian Science Fund (FWF); Institute Vienna Circle (IVC)
- Belgium: Research Foundation Flanders (FWO)
- Cyprus: Cyprus Research Promotion Foundation
- Denmark: Danish Agency for Science, Technology, and Innovation (DASTI); Humanities Research Council
- **Finland:** Academy of Finland, Research Council for Culture and Society (AKA)
- France: National Centre for Scientific Research (CNRS)
- Germany: German Research Foundation (DFG)
- Italy: CIRESS, University of Bologna; IUAV, Venice
- The Netherlands: Netherlands Organisation for Scientific Research (NWO); Evert Willem Beth Foundation
- Norway: Research Council of Norway (RCN)
- Poland: Polish Academy of Sciences (from 2010)
- Portugal: Foundation for Science and Technology (FCT)
- Romania: National University Research Council (CNCSIS)
- **Slovakia:** Slovak Research and Development Agency (SRDA)
- Spain: Council for Scientific Research (CSIC); Inter-ministerial Committee on Science and Technology (CICYT)
- Sweden: Swedish Research Council (VR)
- **Switzerland:** Swiss National Science Foundation (SNF)
- United Kingdom: London School of Economics (LSE)

Partnerships

- **BSPS**: British Society for the Philosophy of Science
- Centre for Logic and Philosophy of Science, University of Ghent
- Centre for Logic, Philosophy of Science and History of Science, University of Bucharest
- Centre for Reasoning, University of Kent
- Center for the Philosophy of Science, University of Pittsburgh
- Centre for Time, University of Sydney
- **CENTRIA:** Centre for Artificial Intelligence, New University of Lisbon
- CIRESS: Interdisciplinary Research Centre for Epistemology and History of Science, University of Bologna
- CPNSS: Centre for Philosophy of Natural and Social Science, London School of Economics
- CRASSH: Centre for Research in the Arts, Social Sciences and Humanities, University of Cambridge
- CRISES: Centre de Recherches Interdisciplinaires en Sciences Humaines et Sociales, University Paul-Valéry, Montpellier III
- **CSMN:** Centre for the Study of Mind in Nature, University of Oslo
- **DiFoS:** Dialogical Foundations of Semantics, Collaborative Research Project within the EUROCORES Programme 'LogICCC'
- **EPSA**: European Philosophy of Science Association
- **HOPOS**: International Society for the History of Philosophy of Science
- IHPST: Institut d'Histoire et de Philosophie des Sciences et des Techniques, Paris
- Institute for History and Foundations of Science, Utrecht University
- IVC: Institute Vienna Circle
- LogiCCC: Modelling Intelligent Interaction Logic in the Humanities, Social and Computational Sciences, EUROCORES Programme
- Munich Centre for Mathematical Philosophy, Ludwig Maximilian University of Munich
- **PCSP:** Philosophy of Contemporary Science in Practice, University of Aarhus
- PSBio: Philosophical Foundations for Systems Biology, University of Oslo
- Tilburg Centre for Logic and Philosophy of Science, Tilburg University
- Zentrum für Philosophie und Wissenschaftstheorie, University of Konstanz
- ZiF: Zentrum für interdisziplinäre Forschung, University of Bielefeld

3.

Overview of PSE's Activities

3.1 Activities in 2008

Opening Conference: The Present Situation in the Philosophy of Science

- Date: 18-20 December
- **Venue:** Institute Vienna Circle (IVC), University of Vienna, Austria
- Organiser: Friedrich Stadler (Steering Committee member, University of Vienna)
- Research Centres and Institution involved: Institute Vienna Circle (IVC), University of Vienna; Interdisciplinary Research Centre for Epistemology and History of Science (CIRESS), University of Bologna; British Society for the Philosophy of Science (BSPS)

• List of Speakers:

Daniel Andler (University of Paris IV, Paris-Sorbonne), Anastasios Brenner (University Paul-Valéry, Montpellier III), Raffaella Campaner (University of Bologna), Cristina Chimisso (Open University, Milton Keynes), Claude Debru (École Normale Supérieure, Paris), Dennis Dieks (Utrecht University), Franz Dietrich (University of Maastricht), Mauro Dorato (University of Rome 3), Mehmet Elgin (Mugla University), Massimo Ferrari (University of Turin), Roman Frigg (London School of Economics), Wenceslao J. Gonzalez (University of A Coruña), Bengt Hansson (University of Lund), Stephan Hartmann (Tilburg University), Michael Heidelberger (University of Tübingen), Vincent Hendricks (Roskilde University), Hannes Leitgeb (University of Bristol), Holger Lyre (University of Augsburg), Miles MacLeod (University of Vienna), Thomas Mormann (University of the Basque Country, Donostia-San

Sebastian), Thomas Müller (Utrecht University), F.A. Muller (Erasmus University Rotterdam), Gabriella Pigozzi (University of Luxembourg), Thomas Reydon (University of Hannover), Arto Siitonen (University of Helsinki), Matti Sintonen (University of Helsinki), László E. Szabó (Eötvös University, Budapest), Thomas Uebel (University of Manchester), Antonio Zilhao (University of Lisbon)

The conference was the opening activity of the PSE Programme. The central aim of the event was to bring together a large number of renowned scholars from all over Europe and directly involved in the project. For PSE members the conference represented the first occasion to not only establish promising contacts and exchanges within the Programme, but



Friedrich Stadler addresses the audience at the opening conference of PSE, Vienna 2008.

Photo courtesy of the Vienna Circle Institute

also to set the future research lines of PSE's activities. Five sessions, one per team, were organised, focusing respectively on the state of the art of philosophical reflections on logic and formal methods, biology and the life sciences, social and cultural sciences, physics, and the history of the philosophy of science. The importance of a historical approach to investigating topics in philosophy of science was strongly emphasised. Common themes emerged and were widely discussed, such as the roots of empiricism in Europe and the significance of pragmatism for future PSE investigations. The conference gave scholars the opportunity to explore specific topics in depth, and to pinpoint common lines of research from an interdisciplinary perspective. In the following years of the Programme, the overlap of different areas of research frequently allowed scholars to put forward innovative and original perspectives in their works.

A critical report on the conference by Friedrich Stadler, Donata Romizi and Miles MacLeod can be found in *Journal for General Philosophy of Science* 40 (2009), n. 1, 129-136.

3.2 Activities in 2009

In 2009, PSE organised three workshops focused on the leading topic of the year, namely 'Explanation, Prediction, and Confirmation'. In addition, the cooperation between PSE and EPSA produced a round table on 'Philosophy of Science in Europe: Past, Present and Future' organised within the second EPSA Conference held in Amsterdam on 21-24 October.

Workshop (Team B): Explanation, Prediction, and Confirmation in Biology and Medicine

• Date: 2-4 October

• Venue: University of Konstanz, Germany

• **Organiser:** Marcel Weber (*Leader of Team B, University of Konstanz*)

Research Centre involved:
 Zentrum für Philosophie und
 Wissenschaftstheorie, University of Konstanz

List of Speakers:

Raffaella Campaner (University of Bologna), Gerd Grasshoff (University of Bern), Franz Huber (University of Konstanz), Andreas Hüttemann (University of Münster), Michael Joffe (Imperial College London), Maria Kronfeldner (University of Bielefeld), Peter McLaughlin (University of Heidelberg), Alexander Reutlinger (University of Münster), Thomas Reydon (University of Hannover), Kenneth Schaffner (University of Pittsburgh), Samuel Schindler (University of Konstanz), Gerhard Schurz (University of Düsseldorf), Daniel Sirtes (University of Basel; University of Konstanz), Wolfgang Spohn (University of Konstanz), Marcel Weber (University of Konstanz), John Worrall (London School of Economics)

The central aim of the workshop was to discuss models of explanation and methodological issues in biology and medicine. The papers delivered focused on some of the most advanced research topics in these interconnected fields and, in particular, explored subjects such as causal explanations in medicine, reductive explanations in biology, evolutionary explanations, mechanistic explanations, conceptual issues in behavioural and psychiatric genetics, and the demarcation of creationism and science with the help of Bayesian confirmation theory. The specificity of the workshop topic allowed participants to compare and share their research results within an appropriate and stimulating context.

Workshop (Teams A, D and E): Physical and Philosophical Perspectives on Probability, Explanation and Time

• Date: 19-20 October

- **Venue:** Woudschoten Conference Centre, Utrecht University, Zeist, The Netherlands
- Organisers: Stephan Hartmann (Leader of Team A, Tilburg University), Dennis Dieks (Leader of Team D, Utrecht University), Thomas Uebel (Leader of Team E, University of Manchester)
- Research Centre involved:
 Institute for History and Foundations of Science,
 Utrecht University

• List of Speakers:

Guido Bacciagaluppi (University of Aberdeen),
Anouk Barberousse (University of Paris I,
Panthéon-Sorbonne), Jeremy Butterfield
(University of Cambridge), Dennis Dieks
(Utrecht University), Franz Dietrich (University
of Maastricht), Mauro Dorato (University of
Rome 3), Maria Carla Galavotti (University
of Bologna), Adam Grobler (Opole University),
Carl Hoefer (University of Barcelona), Gürol
Irzik (Boğaziçi University, Istanbul), Berna
Kilinc (Boğaziçi University, Istanbul), Artur
Koterski (Marie Curie-Sklodowska University,
Lublin), Klaas Landsman (University of
Nijmegen), Joke Meheus (University of Ghent),

Thomas Müller (Utrecht University), Elizabeth Nemeth (University of Vienna), Tomasz Placek (Jagiellonian University, Krakow), Stathis Psillos (University of Athens), Jan-Willem Romeijn (University of Groningen), Eric Schliesser (*University of Leiden*), Maximilian Schlosshauer (University of Copenhagen), Michiel Seevinck (Utrecht University), Peter Spirtes (Carnegie Mellon University, Pittsburgh), Jan Sprenger (Tilburg University), Friedrich Stadler (University of Vienna), Graham Stevens (University of Manchester), Michael Stoeltzner (University of Wuppertal), Patrick Suppes (Stanford University), Thomas Uebel (University of Manchester), Pierre Wagner (University of Paris I, Panthéon-Sorbonne), Gregory Wheeler (New University of Lisbon), Jon Williamson (University of Kent), John Worrall (London School of Economics), Henrik Zinkernagel (University of Granada)

This joint workshop allowed the three Teams involved to engage in debates on probability, explanation and time in their respective fields, namely: formal methods (Team A), physical sciences (Team D), foundational and methodological debates from a historical point of view (Team E). One of the most important outcomes was the recognition of a fascinating area of overlap and common interests among subjects only apparently far from each other. In addition, the workshop offered ample opportunity for future joint projects. The interdisciplinarity was testified by the fact that not only three sessions, one per team, were organised, but also joint sessions allowing direct exchanges among scholars. Various topics were investigated deeply, such as progress in confirmation theory and scientific realism in connection with explanation, the role of probability in modern science, the main issues in the philosophy of time and the historical debates on explanation, prediction and induction. The workshop hosted many eminent speakers (not only belonging to PSE) and concluded with the plenary lecture by Patrick Suppes. The event was open to a diverse audience, including both senior researchers and young scholars from different European countries and from different disciplines. The workshop provided a wonderful opportunity to establish novel and fruitful contacts for future research projects.

A critical report of the workshop by Dennis Dieks can be found in *Journal for General Philosophy of Science* 41 (2010), n. 2, 383-388.

Round table jointly organised by PSE and EPSA on 'Philosophy of Science in Europe: Past, Present and Future' within the second EPSA Conference

- Date: 24 October
- Venue: Vrije University Amsterdam, The Netherlands
- List of Speakers:

Daniel Andler (University of Paris IV, Paris-Sorbonne), Maria Carla Galavotti (University of Bologna), Carl Hoefer (University of Barcelona), Stathis Psillos (University of Athens), Hans Radder (Vrije University Amsterdam), Wolfgang Spohn (University of Konstanz), John Worrall (London School of Economics)

The round table came about due to the strong cooperation and synergy between PSE and EPSA, whose common aim has been to organise activities enhancing the impact of European philosophy of science on the international scenario. The round table offered an opportunity to advertise PSE's activities and more generally ESF's initiatives to a large audience, and stimulated participants to join forces towards building a European identity of philosophy of science. The round table was mentioned in the final report of the EPSA Conference written by Henk de Regt, acting as local organiser, and published in *Journal for General Philosophy of Science* 40 (2009), n. 2, 379-382.

Workshop (Team C): Explanation, Prediction, and Confirmation in the Social Sciences: Realm and Limits

- **Date:** 26-27 October
- Venue: University of Amsterdam, The Netherlands
- Organisers: Wenceslao J. Gonzalez (Leader of Team C, University of A Coruña), Amparo Gomez (Co-leader, University of La Laguna), Marcel Boumans (University of Amsterdam)
- List of Speakers:

Giuliano di Bernardo (University of Trento),
Maria G. Bonome (University of A Coruña),
Marcel Boumans (University of Amsterdam), Jan
Faye (University of Copenhagen), Paolo Garbolino
(IUAV, Venice), Amparo Gomez (University of
La Laguna), Wenceslao J. Gonzalez (University
of A Coruña), Peter Kemp (University of Aarhus),
Hans Lenk (University of Karlsruhe), Paula
Neira (University of Santiago de Compostela),
Katarzyna Paprzycka (University of Warsaw),
Wolfgang Spohn (University of Konstanz), Raimo
Toumela (University of Helsinki), Eugen Zelenak
(Catholic University in Ruzomberok)



Poster of the workshop held in Amsterdam on 26-27 October 2009. Image courtesy of Wenceslao J. Gonzalez

According to the topic of the year, the workshop investigated the role that concepts such as explanation, prediction and confirmation play in the social sciences. Some central aspects arose from the analysis: i) the idea of normativity as a key to the difference between the human and the natural sciences; ii) the methodological role of interpretation in the social sciences; iii) the explanatory role of laws and mechanisms in the social sciences; iv) the characteristics of evidence outside the laboratory; v) the relation between the sciences of the artificial and the social sciences regarding prediction and prescription. The workshop gave a number of junior scholars the opportunity to deliver their own work, exchanging reflections and opinions with some of the most prestigious researchers in the field. For a critical report of the workshop see Wenceslao J. Gonzalez, 'Explanation, Prediction, and Confirmation in the Social Sciences: Realm and Limits (University of Amsterdam, 26-27 October 2009)', in Journal for General Philosophy of Science 41 (2010), n. 2, 389-394.

3.3 Activities in 2010

In 2010, PSE organised four workshops. The leading topic for the third year of the Programme was 'Probability and Statistics'. The five teams investigated the theme within their specific areas, focusing on: i) pluralism in the foundations of statistics (Team A); ii) probability and statistics in the life sciences (Team B) and statistical mechanics (Team D); iii) the debate on mathematical modeling in the social sciences (Team C); iv) historical debates on logic, probability and statistics (Team E).

Workshop (Team E): Historical Debates about Logic, Probability and Statistics

- Date: 9-10 July
- Venue: University of Paderborn, Germany
- Organisers: Thomas Uebel (Leader of Team E, University of Manchester), Michael Stoeltzner (Co-leader, University of South Carolina, Columbia), Volker Peckhaus (University of Paderborn)

• List of Speakers:

Michael Heidelberger (University of Tübingen), Eckehart Köhler (University of Vienna), Artur Koterski (Marie Curie-Sklodowska University, Lublin), Nikolay Milkov (University of Paderborn), Catarina Dutilh Novaes (University of Amsterdam), Volker Peckhaus (University of Paderborn), Miklos Redei (London School of Economics), Donata Romizi (University of Vienna), Graham Stevens (University of Manchester), Michael Stoeltzner (University of South Carolina, Columbia), Jos Uffink (Utrecht University)

The workshop focused on the genesis of the contemporary understanding of probability and statistics, emphasising the close relationship between logic and probability and analysing the historical phase in which logic, probability and statistics jointly became highly mathematised disciplines. Drawing particular attention to the notion of probability, the workshop mainly investigated the plurality of interpretations on the notion which are connected to the different roles that probability itself has played, and still plays, in the various sciences. The meeting was conceived by the organisers as a continuation of the workshop held in Utrecht in 2009. This connection stresses the importance of building enduring links and relationships among scholars, of encouraging the sharing of scientific results and of favouring the development of privileged channels among Research Centres all over Europe.

Workshop (Team A): Pluralism in the Foundations of Statistics

- Date: 9-10 September
- Venue: University of Kent, United Kingdom
- Organisers: Stephan Hartmann (Leader of Team A, Tilburg University), David Corfield (University of Kent)
- Research Centre involved: Centre for Reasoning, University of Kent
- List of Speakers:

David Atkinson (*University of Groningen*), Seamus Bradley (*London School of Economics*), Timothy Childers (Charles University, Prague),
Franz Dietrich (London School of Economics),
Roberto Festa (University of Trieste), Ulrike
Hahn (Cardiff University), Stephan Hartmann
(Tilburg University), Ilkka Niiniluoto
(University of Helsinki), Jeanne Peijnenburg
(University of Groningen), Jan-Willem Romeijn
(University of Groningen), Gerhard Schurz
(University of Düsseldorf), Jan Sprenger (Tilburg
University), Gregory Wheeler (New University of
Lisbon), Jon Williamson (University of Kent)

The major goal of the workshop was to bring together researchers from different fields, such as philosophy, psychology and statistics. Participants discussed the multiplicity of methodological tools and kinds of evidence employed, and metaphysical aspects of statistics. The talks revealed unexplored interconnections between the work of researchers across Europe and across disciplines. The small size and specificity of the meeting were appreciated insofar as they favoured productive and intensive discussions.

Workshop (Team C): The Debate on Mathematical Modeling in the Social Sciences

- Date: 23-24 September
- Venue: University of A Coruña, Spain
- Organisers: Wenceslao J. Gonzalez (Leader of Team C, University of A Coruña), Amparo Gomez (Co-leader, University of La Laguna)
- List of Speakers:

Daniel Andler (University of Paris IV, Paris-Sorbonne), Marcel Boumans (University of Amsterdam), Javier Echeverria (University of the Basque Country, Donostia-San Sebastian), Maria Carla Galavotti (University of Bologna), Donald Gillies (University College London), Rainer Hegselmann (University of Bayreuth), David F. Hendry (University of Oxford), Ladislav Kvasz (Comenius University, Bratislava), Adrian Miroiu (National School of Political Studies and Public Administration, Bucharest), Ilkka Niiniluoto (University of Helsinki), Federica Russo (University of Kent), Antonio Zilhao (University of Lisbon)

The workshop investigated three kinds of topics: i) a reflection on the status of mathematical modeling, taking into account the differences between mathematics as a language aimed at establishing models, and mathematics as a heuristic device to broaden knowledge; ii) the search for similarities



Poster of the workshop held in A Coruña on 23-24 September 2010. Image courtesy of Wenceslao J. Gonzalez

and differences between social sciences and natural sciences, in the light of the features of mathematical modeling in the two sets of disciplines; iii) the study of causality and models in social research developed according to various approaches (ontological, epistemological, etc.), in order to see their impact on modeling in social research. The workshop had a strong interdisciplinary character, involving several notable speakers from different fields such as philosophy, mathematics, econometrics, political science and cognitive science.

Workshop (Teams B and D): Points of Contact between the Philosophy of Physics and the Philosophy of Biology: Probability, Laws and Natural Kinds

- Date: 13-15 December
- **Venue:** London School of Economics, United Kingdom
- Organisers: Miklos Redei (Co-Chair, London School of Economics), Dennis Dieks (Leader of Team D, Utrecht University)
- Research Centre involved: Centre for Philosophy of Natural and Social Science (CPNSS), London School of Economics
- List of Speakers:

Hanne Andersen (University of Aarhus), Bengt Autzen (London School of Economics), Michael Baumgartner (University of Konstanz), Dennis Dieks (Utrecht University), Mauro Dorato (University of Rome 3), John Dupré (University of Exeter), Michael Esfeld (University of Lausanne), Steven French (University of Leeds), Roman Frigg (London School of Economics), Sara Green (University of Aarhus), Paul Hoyningen-Huene (University of Hannover), Marie I. Kaiser (University of Münster), Meinard Kuhlmann (University of Bremen), Sabina Leonelli (University of Exeter), Holger Lyre (University of Magdeburg), Michela Massimi (University

College London), Sebastian Mateiescu (University of Bucharest), Eric Raidl (IHPTS, Paris), Miklos Redei (London School of Economics), Thomas Reydon (University of Hannover), Federica Russo (University of Kent), Christian Sachse (University of Lausanne), Marcel Weber (University of Konstanz), Charlotte Werndl (London School of Economics)

The central aim of the workshop was to bring together philosophers of physics and philosophers of biology, giving them an opportunity to overcome the barriers which usually separate their fields. In addition, the format of the workshop was arranged to bridge the gap between these disciplines: thanks to a system of 'physics/biology cross-commenting', most of the talks in philosophy of physics were commented on by a respondent from the philosophy of biology, and vice versa. The workshop thus showed that fruitful debate is possible between the philosophy of physics and the philosophy of biology. An example of such constructive discussion was the emergence of an overlapping area which interprets the concept of structure as it is used in various forms of structural realism in physics as a unifying concept for both disciplines. Even if some concepts remain fundamentally different in physics and biology, for instance that of reduction, other topics deserve the same attention in both areas. Among others, the need to develop a new kind of metaphysics to account for recent scientific results, and the role, if any, of the notion of mechanism were discussed. A further major outcome was the involvement of a high number of young scholars - fifteen junior researchers - who represented more than half of the total number of speakers, and who took an active part in the conference by delivering presentations and commentaries.

3.4 **Activities in 2011**

In 2011, the five teams organised four workshops to investigate the year topic: 'The Sciences that Philosophy has Neglected'. Moreover, PSE organised two additional activities: i) a symposium within the third EPSA Conference held in Athens on October 7; ii) a conference jointly organised with the Institute Vienna Circle (IVC) to celebrate the 20th anniversary of its foundation (Vienna, December 5-7).

Workshop (Team B): Philosophy of Systems Biology

- Date: 18-20 August
- Venue: University of Aarhus, Denmark
- Organisers: Marcel Weber (Leader of Team B, University of Konstanz), Hanne Andersen (Co-leader, University of Aarhus)
- Research Groups involved: Research Group 'Philosophical Foundations for Systems Biology' (PSBio), University of Oslo; Research Group 'Philosophy of Contemporary Science in Practice' (PCSP), University of Aarhus
- List of Speakers:

Hanne Andersen (University of Aarhus), William Bechtel (University of California, San Diego), Manfred Drack (University of Vienna), Melinda Bonnie Fagan (Rice University, Houston), Gabriele Gramelsberger (Free University of Berlin), Sara Green (University of Aarhus), Brian Hepburn (University of Aarhus), Michael Joffe (Imperial College London), Tarja Knuuttila (University of Helsinki), Ulrich Krohs (University of Bielefeld), Marco Nathan (Columbia University, New York), Nancy Nersessian (Georgia Institute of Technology, Atlanta), Gry Oftedal (University of Oslo), Veli-Pekka Parkkinen (University of Oslo), Samuel Schindler (University of Konstanz), Matti Sintonen (University of Helsinki), Anders Strand (University of Oslo), Susann Wagenknecht (University of Aarhus), Marcel Weber (University of Konstanz), Carsten Wiuff (University of Aarhus), Olaf Wolkenhauer (University of Rostock)

The workshop brought together philosophers of science working on systems biology and scientists working in systems biology, thus aiming to transcend the disciplinary boundaries. This allowed direct and fruitful interactions between philosophers and scientists, not only from different European countries, but also from the USA. The workshop showed that the quite recent investigations in the field of systems biology can offer original philosophical perspectives with regard to some central concepts in the philosophy of science, such as causality, modeling and experimentation, explanation and mechanisms. The meeting strongly promoted an interdisciplinary approach and was orientated to establish productive contacts among senior and junior researchers. It also demonstrated the fruitful collaboration that existed between the ESF-PSE Research Networking Programme and two local research projects: 'Philosophy of Contemporary Science in Practice' (University of Aarhus) and 'Philosophical Foundations for Systems Biology' (University of Oslo).

Workshop (Teams A and D): The Philosophy of Computer Science and Artificial Intelligence

- Date: 9-10 September
- Venue: Ponta Delgada, Azores, Portugal
- Organisers: Stephan Hartmann (Leader of Team A, Tilburg University), Dennis Dieks (Leader of Team D, Utrecht University), Gregory Wheeler (Steering Committee member, New University of Lisbon)
- Research Centre and Project involved: Centre for Artificial Intelligence (CENTRIA), New University of Lisbon; Dialogical Foundations of Semantics (DiFoS, within the ESF EUROCORES Programme LogICCC)
- List of Speakers:

Jesse Alama (New University of Lisbon), Guido Bacciagaluppi (University of Aberdeen), Hans Briegel (University of Innsbruck), Earl Campbell (University College London), Dennis Dieks (Utrecht University), Luciano Floridi (University of Hertfordshire; University of Oxford), Roberto Giuntini (University of Cagliari), Alexei Grinbaum (IRAMIS, Paris), Stephan Hartmann (Tilburg University), Leon Horsten (University of Bristol), Franz Huber (University of Konstanz), Pieter Kok (University of Sheffield), Kristina Liefke (Tilburg University), Thomas Müller (Utrecht University), Gabriella Pigozzi (Paris Dauphine University), Ulrike Pompe (University) of Stuttgart), Sam Sanders (University of Ghent), Francisco C. Santos (New University of Lisbon), Sonja Smets (University of Groningen), Choh Man Teng (New University of Lisbon), Gregory Wheeler (New University of Lisbon), Leszek Wronski (Jagiellonian University, Krakow)

The workshop hosted members of both the formal methods group (Team A) and the physical sciences group (Team D) for a joint exploration of several philosophical problems of computer science and Artificial Intelligence. In detail, the talks focused on methods from physics applicable to Artificial Intelligence, on model-building techniques, the foundations of quantum computing and quantum information. The main purpose of the workshop was to show how the philosophy of Artificial Intelligence actively contributes to the development of formal and computational models of various cognitive capacities, including belief fixation and change, judgment and decision-making, perception, natural language understanding and reasoning under conditions of uncertainty. It was emphasised how the overlap of several areas, such as philosophy,

physics and Artificial Intelligence, allows scholars to achieve concrete and encouraging results in the development of innovative and challenging investigations. Moreover, the workshop successfully involved a number of younger scholars who collaborate with the Research Centre organising the event.

Workshop (Team C): The Sciences of the Artificial vs. the Cultural and Social Sciences

- Date: 15-16 September
- Venue: University of Bucharest, Romania
- Organisers: Wenceslao J. Gonzalez (Leader of Team C, University of A Coruña), Amparo Gomez (Co-Leader, University of La Laguna), Adrian Miroiu (Steering Committee member, University of Bucharest)
- Research Centre involved: Centre for Logic,
 Philosophy of Science and History of Science,
 University of Bucharest

List of Speakers:

María José Arrojo (University of A Coruña),
Subrata Dasgupta (University of Louisiana,
Lafayette), Paolo Garbolino (IUAV, Venice),
Amparo Gomez (University of La Laguna),
Wenceslao J. Gonzalez (University of A Coruña),
Bengt Hansson (University of Lund), James
W. McAllister (University of Leiden), Ilkka
Niiniluoto (University of Helsinki), Demetris
Portides (University of Cyprus, Nicosia), Arto
Siitonen (University of Helsinki), Mihai
Ungureanu (National School of Political Studies
and Public Administration, Bucharest), Gregory
Wheeler (New University of Lisbon)

The aim of the workshop was to suggest new reflections and analyses on the sciences of design as well as on the social sciences, and therefore on disciplines related to human-made contexts. Although the socialled 'sciences of the artificial' have been neglected by mainstream philosophy of science, they actually



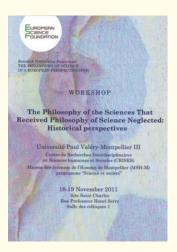
Poster of the workshop held in Bucharest on 15-16 September 2011. Image courtesy of Jéssica Rey have major links with both the cultural and social sciences. In this connection, some of the most innovative and stimulating topics in the field of social and cultural sciences have been examined in depth: the various characterisations of the concept of complexity in the sciences of artificial, the distinction between 'human activity' and 'human behaviour', the need for concomitant causal explanations and reasons or intentions in the social sciences, the crucial role of interpretation and understanding in disciplines such as archaeology. It was possible to pinpoint interesting common subjects among the different disciplines and analyse such issues as the dynamic dimension of complexity, the difficulty of establishing a clear distinction between research and applied sciences, the role of idealisation in the social sciences, or the interweaving between the social sciences and the cultural sciences.

Workshop (Team E): The Philosophy of the Sciences that Received Philosophy of Science Neglected: Historical Perspectives

- Date: 18-19 November
- Venue: University Paul-Valéry, Montpellier III, France
- Organisers: Thomas Uebel (Leader of Team E, University of Manchester), Anastasios Brenner (University Paul-Valéry, Montpellier III)
- Research Centres involved: Centre de Recherches Interdisciplinaires en Sciences Humaines et Sociales (CRISES), University Paul-Valéry, Montpellier III; Maison des Sciences de l'Homme de Montpellier (MSH-M)

List of Speakers:

Donato Bergandi (Muséum national d'Histoire naturelle, Centre Alexandre Koyré, Paris), Anastasios Brenner (University Paul-Valéry, Montpellier III), Cristina Chimisso (Open University, Milton Keynes), Jean-Marc Drouin (Muséum national d'Histoire naturelle, Centre Alexandre Koyré, Paris), Massimo Ferrari (University of Turin), Michael Heidelberger (University of Tübingen), François Henn (University of Montpellier II), Veronika Hofer (Medical University of Vienna), Berna Kilinc (Boğaziçi University, Istanbul), Artur Koterski (Marie Curie-Sklodowska University, Lublin), Thierry Lavabre-Bertrand (University of Montpellier I), Thomas Mormann (University of the Basque Country, Donostia-San Sebastian), Elisabeth Nemeth (University of Vienna), Pascal Nouvel (University Paul-Valéry, Montpellier III), Daniel Parrochia (University Jean Moulin, Lyon III), Graham Stevens (University of



Poster of the workshop held in Montpellier on 18-19 November 2011. Image courtesy of Marie Brenner

Manchester), Michael Stoeltzner (University of South Carolina, Columbia), Thomas Uebel (University of Manchester), Pierre Wagner (University of Paris I, Panthéon-Sorbonne), Julie Zahle (University of Copenhagen)

In accordance with the fourth year theme, the aim of the workshop was to draw attention to those sciences that had been relatively little discussed in the past. The meeting suggested a more complex view of the European philosophy of science than the one that is often assumed, taking into account not only those parts that have been integrated into the analytic tradition, but also those sources and debates that have been forgotten or discarded. More specifically, the topics discussed spanned a wide spectrum of themes such as the rediscovered philosophical aspects of topology, the French tradition in the philosophy of science, the different receptions of Kantianism and Neokantianism in Italy and France, a comparison of different approaches to problems of natural history in biology, and an alternative Austrian approach to economics. Not only was the workshop able to give room to the discussion of disciplines and sub-disciplines so far neglected in the philosophy of science, but it also promoted an interdisciplinary historical approach, investigating specific topics within many different fields, such as biology and chemistry, economics, mathematics and linguistics.

PSE Symposium on 'New Challenges for Philosophy of Science' within the third EPSA Conference

- Date: 7 October
- Venue: University of Athens, Greece
- Organisers: Raffaella Campaner (University of Bologna), Theo Kuipers (University of Groningen)
- List of Speakers:

Daniel Andler (University of Paris IV, Paris-

Sorbonne), Raffaella Campaner (University of Bologna), Roman Frigg (London School of Economics), Olav Gjelsvik (University of Oslo), Theo Kuipers (University of Groningen). Chair: Maria Carla Galavotti (University of Bologna)

The PSE Symposium was organised within the wider context of the third EPSA Conference, thus reflecting the close cooperation between the two projects. The Symposium speakers included two of the PSE Steering Committee members (Olav Gjelsvik and Theo Kuipers) and three PSE members from different Teams: Daniel Andler (Team C), Raffaella Campaner (Team B) and Roman Frigg (Team D). Maria Carla Galavotti introduced and chaired the PSE session. The Symposium aimed to show how contemporary philosophy of science interacts with emerging scientific disciplines such as medicine, design, cognitive science and climate studies. The Symposium also highlighted how foundational and methodological analysis of these disciplines is being pursued through a clarification of crucial concepts such as those of scientific explanation, prediction, reduction, and through studies on multilevel model-building. Close attention was devoted to how theoretical issues and the ways in which they are addressed are intertwined with the distinctive practical exigencies and application purposes of these disciplines. It was argued that the focus on some of the most recent and innovative trends in philosophy of science will shed light on what will most likely be their future developments and new directions.

PSE-IVC joint Conference: Philosophy of Science in Europe – European Philosophy of Science and the Viennese Heritage

- Date: 5-7 December
- Venue: Institute Vienna Circle (IVC), University of Vienna, Austria
- Organiser: Friedrich Stadler (Steering Committee member, University of Vienna)
- Research Centre and Institution involved: Institute Vienna Circle (IVC), University of Vienna; Wien Kultur
- List of Speakers:

John Beatty (University of British Columbia, Vancouver), Ingrid Belke (Deutsches Literaturarchiv Marbach), Cristina Chimisso (Open University, Milton Keynes), Richard Creath (Arizona State University, Phoenix), Hans-Joachim Dahms (University of Vienna), Christian Damböck (University of Vienna), Richard Dawid (University of Vienna), Claude Debru (École



Poster of the conference held in Vienna on 5-7 December 2011. Copyright Kognito Gestaltung

Normale Supérieure, Paris), Michael Esfeld (University of Lausanne), Jan Faye (University of Copenhagen), Massimo Ferrari (University of Turin), Owen Flanagan (Duke University, Durham), Maria Carla Galavotti (University of Bologna), Olav Gjelsvik (University of Oslo), Rainer Hegselmann (University of Bayreuth), Michael Heidelberger (University of Tübingen), Veronika Hofer (Medical University of Vienna), Allan Janik (University of Innsbruck), Eckehart Köhler (University of Vienna), Heidi König-Porstner (University of Vienna), Daniel Kuby (University of Vienna), Theo Kuipers (University of Groningen), Martin Kusch (University of Vienna), Ladislav Kvasz (Comenius University, Bratislava; Charles University, Prague), Christoph Limbeck-Lilienau (University of Vienna), Pablo Lorenzano (Universidad National de Quilmes, Buenos Aires), Jane Maienschein (Arizona State University, Phoenix), Michela Massimi (University College London), Thomas Mormann (University of the Basque Country, Donostia-San Sebastian), Elisabeth Nemeth (University of Vienna), Matthias Neuber (University of Tübingen), John D. Norton (University of Pittsburgh), Herlinde Pauer-Studer (University of Vienna), Jeanne Peijnenburg (University of Groningen), Otto Pfersmann (University of Paris I, Panthéon-Sorbonne), Tomasz Placek (Jagiellonian University, Krakow), Stathis Psillos (University of Athens), Wlodek Rabinowicz (University of Lund), Miklos Redei (London School of Economics), Donata Romizi (University of Vienna), Günther Sandner (University of Vienna), Georg Schiemer (Ludwig Maximilian University of Munich), Michael Schorner (University of Innsbruck), Karl Sigmund (University of Vienna), Matti Sintonen (University of Helsinki), Antonia Soulez (University of Paris VIII), Friedrich Stadler (University of Vienna), Michael Stoeltzner



Fifth Steering Committee meeting, Vienna 2011. Photo courtesy of the Vienna Circle Institute

(University of South Carolina, Columbia),
Thomas Uebel (University of Manchester),
C. Kenneth Waters (University of Minnesota,
Minneapolis), Peter Weibel (Zentrum für Kunst
und Medientechnologie, Karlsruhe), Gregory
Wheeler (New University of Lisbon), Jan
Wolenski (Jagiellonian University, Krakow),
Gereon Wolters (University of Konstanz)

The international conference was organised by the Institute Vienna Circle (IVC) on the occasion of its 20th anniversary. The PSE actively cooperated with IVC in organising the event and a number of speakers delivering papers were members of the Programme.

The conference focused on the specific features of a genuine European philosophy of science as compared to philosophy of science in Europe. In this regard, the talks documented the fact that contemporary philosophy of science mainly originated in Europe and decisively influenced the subsequent developments of globalised philosophy of science, especially in North America. Recent research highlighted some specific characteristics of philosophy of science (including philosophy of the natural, social and cultural sciences) in the European context up to the forced migration and transformation caused by the political scenario in the 20th century. In particular, the historical, pragmatist and interdisciplinary approaches bridging the gap between the analytic and continental philosophy of science were stressed. The high number of both European and American philosophers taking part in the conference allowed fruitful interaction with participants sharing the latest results in the field. Speakers from the younger generation represented a promising sign for the future of philosophy of science. Most of the contributions were collected in the volume 'Philosophy of Science in Europe – European Philosophy of Science and the Viennese Heritage', published by Springer, to appear in Autumn 2013 (see Section 5.1).

3.5 **Activities in 2012**

In 2012, the plenary conference of the PSE Programme was organised. The conference represented an opportunity for PSE members to build on the results achieved during the preceding years of the Programme and to set the ground for future investigations in philosophy of science and other interconnected disciplines. In the last year, PSE also promoted two additional activities, at the University of Lausanne and at the University of Cambridge.

Plenary Conference: New Directions in the Philosophy of Science

- Date: 17-20 October
- **Venue:** Bertinoro Conference Centre, University of Bologna, Italy
- Organiser: Maria Carla Galavotti (Chair of the Programme, University of Bologna)
- Institutions involved: Interdisciplinary Research Centre for Epistemology and History of Science (CIRESS), University of Bologna; Springer International Publisher
- List of Speakers:

Pablo Acuña (Utrecht University), Chiara Ambrosio (University College London), Daniel Andler (University of Paris IV, Paris-Sorbonne), Guido Bacciagaluppi (University of Aberdeen), Anastasios Brenner (University Paul-Valéry, Montpellier III), Peter Brössel (University of Mainz), Raffaella Campaner (University of Bologna), Cristina Chimisso (Open University, Milton Keynes), Adam Caulton (University of Cambridge), Sean Crawford (University of Manchester), Mehmet Elgin (Muğla University), Uljana Feest (Techincal University Berlin), Massimo Ferrari (University of Turin), Christopher A. Fuchs (Perimeter Institute for Theoretical Physics, Waterloo, Ontario), Jean Gayon (University of Paris I, Panthéon-Sorbonne), Pierre-Luc Germain (European School of Molecular Medicine, Milan), Ulrike Hahn (Cardiff University), Stephan Hartmann (Tilburg University), Ronnie Hermens (University of Groningen), Marie I. Kaiser (University of Cologne), Tarja Knuuttila (University of Helsinki), Christoph Limbeck-Lilienau (University of Vienna), Chiara Lisciandra (Tilburg University), Thomas Müller (Utrecht University), F.A. Muller (Utrecht University), Matthias Neuber (University of Tübingen), Katarzyna Paprzycka (University of Warsaw), Huw Price (University of Cambridge), Miklos Redei (London School of Economics), Thomas Reydon (University of



Group Picture at the Bertinoro Conference 2012. Photo courtesy of Maria Carla Galavotti



Patrick Suppes and Maria Carla Galavotti, Bertinoro Conference 2012. Photo courtesy of Maria Carla Galavotti

Hannover), David-Hillel Ruben (University of London), Matti Sintonen (University of Helsinki), Wolfgang Spohn (University of Konstanz), Michael Stoeltzner (University of South Carolina, Columbia), Patrick Suppes (Stanford University), Petr Svarny (Charles University, Prague), Obdulia Torres (University of Salamanca), Thomas Uebel (University of Manchester), Jeroen Van Bouwel (University of Ghent), Barbara Vetter (Humboldt University Berlin), C. Kenneth Waters (University of Minnesota, Minneapolis), Gregory Wheeler (New University of Lisbon), Leszek Wronski (Jagiellonian University, Krakow)

The PSE plenary conference showed the successful results of interdisciplinary networking and cooperation carried out in the area of the philosophy of science. The high number of invited scholars from both European and overseas countries reinforced fruitful contacts among people working at some of the most prestigious Research Centres in the field. Papers delivered during the conference presented the most advanced scientific results on a large number of specific topics. Each session was devoted to in-depth discussion raising new questions in the main areas addressed by the Programme. Within each area new themes of interest and innovative lines for further investigations were promoted.

More in detail, the following topics were addressed: i) the adoption of formal methods in philosophy of science, the relations between cognitive science and Artificial Intelligence, and original ways of applying formal methods in such fields as decision-making and policy disagreement (Team A); ii) the relations between properly philosophical and strictly empirical aspects of the philosophy of the natural and life sciences and the investigation into the practice of the biological and health sciences (Team B); iii) the re-discovery and the re-interpretation of different approaches to social sciences and human action theories (Team C); iv) the interpretations of quantum mechanics and the investigations on issues related to causal-probabilistic modeling, information-theoretical standpoints and metaphysical views (Team D); v) new readings of some of the main authors in the 20th century European philosophical scenario (Team E). Moreover, two distinguished speakers were invited to give evening lectures, namely Patrick Suppes and Huw Price. A considerable number of junior scholars delivered papers at the conference, thus having a chance to obtain feedback comments on their own investigations, and enlarging their network relations. The conference involved a number of internationally renowned participants and offered a unique chance for new exchanges and durable scientific relations to be made.

Workshop: Causation, Dispositions and Probabilities in Physics and Biology

- Date: 22-24 November
- Venue: University of Lausanne, Switzerland
- Organiser: Michael Esfeld (Steering Committee member, University of Lausanne)
- List of Speakers:

Jan Baedke (Ruhr-University Bochum), Andreas Bartels (University of Bonn), Claus Beisbart (University of Bern), Mark Colyvan (University of Sydney), Dennis Dieks (Utrecht University), Isabelle Drouet (IHPST, Paris), Michael Esfeld (University of Lausanne), Jan Faye (University of Copenhagen), Mario Hubert (Ludwig Maximilian University of Munich), Dustin Lazarovici (Ludwig Maximilian University of Munich), Francesca Merlin (IHPST, Paris), Tomasz Placek (Jagiellonian University, Krakow), Tim Räz (University of Lausanne), Miklos Redei (London School of Economics), Cristian Saborido (University of the Basque Country, Donostia-San Sebastian), Christian Sachse (University of Lausanne), Raphael Scholl (University of Lausanne), Gabor Hofer-Szabo (Hungarian Academy of Science, Budapest), Karim Thebault

(Ludwig Maximilian University of Munich), Max Urchs (European Business School, Wiesbaden), Marcel Weber (University of Geneva)

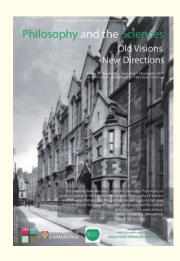
The aim of the workshop was to examine which role the concepts of 'causation', 'dispositions' and 'probability' play in biology, physics and mathematics, and to investigate how the discussions on these topics within different scientific fields can profit from each other. To achieve this goal, the workshop brought together researchers in philosophy of mathematics and physics with researchers in the philosophy of biology. More specifically, the workshop explored the following research themes: i) the role of mathematics in physical and biological explanations; ii) the temporal asymmetry and direction of time in physics and biology; iii) the nature of probabilities in physics and biology; iv) the status of properties and laws; v) causation and self-organisation in complex systems. The discussion highlighted some critical aspects as well as some of the latest interpretations of these topics, thus reflecting the lively debate in these interconnected areas. An interdisciplinary approach allowed a better definition of fundamental notions in the philosophy of science by comparing their applications and interpretations in different branches of the field.

PSE-CRASSH joint workshop: Philosophy and the Sciences – Old Visions, New Directions

- Date: 30 November 1 December
- Venue: CRASSH, University of Cambridge, United Kingdom
- Organiser: Huw Price (University of Cambridge)
- Research Institutions involved: Centre for Research in the Arts, Social Sciences and Humanities (CRASSH), University of Cambridge; The Cambridge Philosophy of Science network (CamPoS)

• List of Speakers:

Anna Alexandrova (University of Cambridge),
Markus Arndt (University of Vienna), Jeremy
Butterfield (University of Cambridge), Hasok
Chang (University of Cambridge), Roberto
Fumagalli (University of Bayreuth), Maria Carla
Galavotti (University of Bologna), Paul Griffiths
(University of Exeter; University of Sydney),
Martin Kusch (University of Vienna), Hannes
Leitgeb (Ludwig Maximilian University of
Munich), Tim Lewens (University of Cambridge),
Sebastian Lutz (Utrecht University), Kerry
McKenzie (University of Leeds), Veli PekkaParkkinen (University of Oslo), Michael Potter



Poster of the PSE-CRASSH joint workshop held in Cambridge on 30 November – 1 December 2012. Image reproduced courtesy of the Cavendish Laboratory

(University of Cambridge), Huw Price (University of Cambridge), Donata Romizi (University of Vienna), Henrik Rydenfelt (University of Helsinki), Friedrich Stadler (University of Vienna), Bram van Leeuwen (University College London), Julie Zahle (University of Copenhagen)

The workshop explored changing conceptions of the relation between philosophy and the special sciences over the past century. A particular focus was placed on the fruitful exchanges between Cambridge and Vienna in 20th century philosophy of science, and for this reason speakers included a number of scholars from those universities. The workshop intended to reconstruct the historical basis of these relations and to set the ground for future connections in European and world philosophy of science. It was emphasised that 21st century philosophy of science is closer to actual scientific practice than it was in the past.

This theme emerged in discussions on pragmatism and pluralism, on experimental approaches to metaphysics and in the rejection of sharp dichotomies between the natural and the social sciences. The meeting also generated a collaboration between the PSE Programme and the Centre for Research in the Arts, Social Sciences and Humanities in Cambridge. During the workshop eight junior scholars had the opportunity to deliver papers and to exchange the results of their research to the senior scholars. The workshop attracted a large audience and was a resounding success.

4.

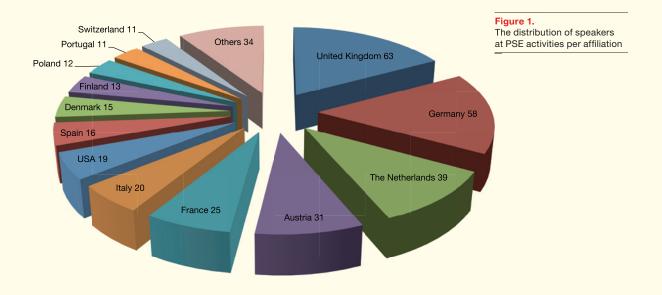
Facts and Figures

A large number of speakers took part in PSE's activities. PSE's workshops and conferences brought together researchers from all over Europe as well as from overseas countries, including the USA, Canada and Australia (see Figures 1 and 2).

The Programme strongly encouraged the active participation of young scholars and doctoral students in workshops and conferences. It also aimed at promoting their mobility among European Universities and Research Centres (see Figure 3). Junior scholars were invited both to comment on the main papers and to deliver talks presenting their own research within dedicated sessions.

PSE organised its activities so as to involve not only members of the Programme but also external scholars (see Figure 4). This policy reinforced relationships with a number of Research Institutions and established an extremely rich network of contacts worldwide.

The figures do not consider people involved in the two PSE activities organised jointly with EPSA, namely: i) the round table on 'Philosophy of Science in Europe: Past, Present and Future' held at Vrije University Amsterdam on October 24, 2009; ii) the Symposium on 'New Challenges for Philosophy of Science' held at the University of Athens on 7 October 2011.



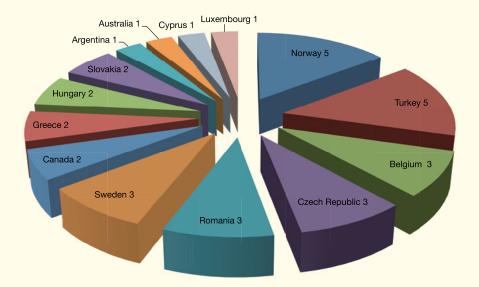


Figure 2.

The distribution of speakers at PSE activities per affiliation specifying the heading 'Others' in Figure 1

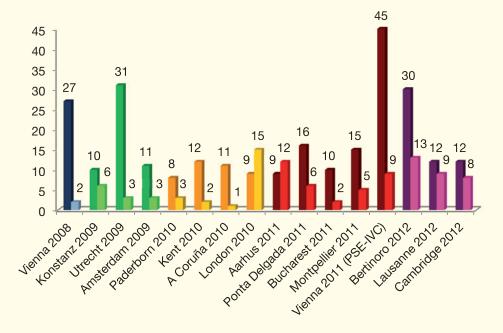


Figure 3.

The distribution of senior and junior speakers at PSE activities

Darker colour: senior scholars (268) Lighter colour: junior scholars (99)

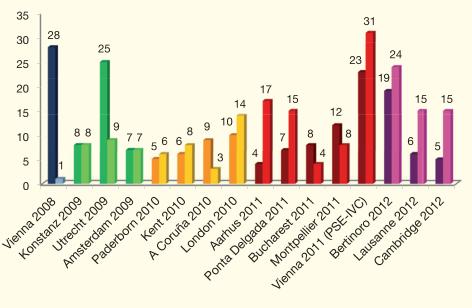


Figure 4.

The distribution of PSE's members and external scholars who delivered papers at PSE activities

Darker colour: PSE's members (182) Lighter colour: non-PSE's members (185)

5.

Dissemination and Publications



5.1 PSE's Proceedings

A key objective of PSE was the publication of a series of books assembling the achieved results. The series is called 'The Philosophy of Science in a European Perspective' and is published by Springer under the responsibility of an editorial board comprising the members of the PSE Steering Committee. The series editors are Maria Carla Galavotti and Friedrich Stadler. The series consists of five volumes, reflecting each year's scientific activities:

The Present Situation in the Philosophy of Science

(proceedings of the conference held in Vienna, 18-20 December 2008), edited by Friedrich Stadler, Dennis Dieks, Wenceslao J. Gonzalez, Stephan Hartmann, Thomas Uebel, Marcel Weber, Springer, 2010.

The volume is reviewed by Stathis Psillos in *Metascience* 20 (2011), n. 2, 415-416.

Explanation, Prediction, and Confirmation

(proceedings of the workshops held in 2009), edited by Dennis Dieks, Wenceslao J. Gonzalez, Stephan Hartmann, Thomas Uebel, Marcel Weber, Springer, 2011.

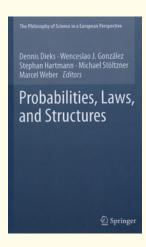
Probabilities, Laws, and Structures (proceedings of the workshops held in 2010), edited by Dennis Dieks, Wenceslao J. Gonzalez, Stephan Hartmann, Michael Stoeltzner, Marcel Weber, Springer, 2012.

New Challenges to Philosophy of Science (proceedings of the activities held in 2011), edited by Hanne Andersen, Dennis Dieks, Wenceslao J. Gonzalez, Thomas Uebel, Gregory Wheeler, Springer, 2013.

New Directions in the Philosophy of Science (proceedings of the activities held in 2012), edited by Maria Carla Galavotti, Dennis Dieks, Wenceslao J. Gonzalez, Stephan Hartmann, Thomas Uebel, Marcel Weber, Springer, to be published in 2014.









Covers of the first 4 volumes of the PSE series

In addition to PSE's proceedings, two more volumes collecting the contributions delivered at the PSE-IVC joint conference held in Vienna on December 5-7, 2011 are under print:

Philosophy of Science in Europe – European
Philosophy of Science and the Viennese
Heritage, edited by Maria Carla Galavotti,
Elisabeth Nemeth, Friedrich Stadler, Springer,
to appear in Autumn 2013.

Die europäische Wissenschaftsphilosophie und das Wiener Erbe, edited by Elisabeth Nemeth and Friedrich Stadler, Springer, to appear in Autumn 2013.

5.2 Publications

The scientific publications produced by PSE members during the Programme's life are so numerous it would be impossible to list them all. They include articles in and special issues of ranked journals, monographic essays, research collections, readings, proceedings of international workshops and conferences, and book chapters. A significant sample can be found on the Publications page of PSE's website (www.pse-esf.org). In addition, a new EPSA-PSE series, published by Springer, is being planned as a joint effort to further strengthen European philosophy of science.

6.

Scientific Insights

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This last section collects statements of appreciation and personal reflections by some Steering Committee members and Team leaders.

Professor Miklos Redei (Co-Chair)

London School of Economics, United Kingdom "Philosophy of science as a modern discipline was born in Europe during the first part of the 20th century, and it contributed substantially to the intellectual climate that made the great advances of modern sciences possible. The five years of the ESF Programme PSE has given a tremendous boost to contemporary philosophy of science in Europe: by involving essentially all the active scholars in the field in Europe, it created cooperation of philosophers across the continent on a level unprecedented in the history of philosophy. Both as a representative of the UK on the Steering Committee and as a faculty member of the London School of Economics with its rich tradition in philosophy of science, I was especially pleased to see many colleagues in the academic community in the UK participating in the Programme activities. The impact of the network is not limited to the numerous conferences, workshops and publications actually produced by the Programme: the exchange of ideas and the personal contacts made possible by the Programme have led to additional joint actions and projects that went beyond the Programme proper. Nor is the impact limited in time: members of a new generation of young philosophers of science from many European countries have taken their first steps in the profession by having been invited to take part in the Programme events. They have performed superbly. What they have seen, learned and experienced will shape the future of philosophy of science in Europe."

Professor Gereon Wolters (Co-Chair)

University of Konstanz, Germany

"The five teams of PSE have generated a host of innovative and important results in almost all fields of philosophy of science. The Springer volumes of the meetings are excellent evidence for this success. There is, however, another - political - type of result, which is less tangible but possibly more important in the long run: the PSE Programme has created over the years something like a European identity of European philosophers of science. Most of us did not know each other before PSE and the network that preceded it, which were both founded on the initiative of Maria Carla Galavotti (Bologna). We took notice of each other's work only in rather contingent ways; in most cases only after it had been acknowledged in some way or other in the Anglophone world. This has changed. I think that now almost all European researchers know the other people in their field and follow their work. The European Philosophy of Science Association (EPSA) and the European Journal for Philosophy of Science (EJPS) that were both founded in close connection with PSE are brilliant proofs of this."

Professor Claude Debru (Steering Committee member)

École Normale Supérieure, Paris, France

"Europe is culturally very diverse. However, thanks to the PSE Programme, colleagues working in different places, having different academic habits and using different languages at home were able to interact in a highly productive way. In the last decades science itself has become far more diverse. Biology is no more a unified domain and in some places the term biologies is in use. This was greatly reflected in our discussions. Another point of inter-

est, among many others, is the relationship between philosophy of science in its European spirit and philosophy itself – especially philosophy of knowledge in general. It seems that epistemology, philosophy of knowledge and cognitive science interact to a great extent today. This is not surprising given the history of philosophical debates in Europe. Clearly enough, if there is a field of cooperation in which Europe has a future, this is science, including its philosophical dimensions."

Professor Olav Gjelsvik (Steering Committee member)

University of Oslo, Norway

"The PSE Programme has been a major, probably the major, force in the last few years in promoting research, research interaction, and research cooperation in philosophy of science throughout Europe. It has supported a large number of important conferences and meeting places, with a special concern for the young and talented in the field. It is the sort of effort that any discipline hungers for. The people in charge of PSE were in the right place at the right time, and have done the very best with it."

Professor Theo Kuipers (Steering Committee member)

University of Groningen, The Netherlands

"Philosophy of science is partly a complex metadiscipline due to the variety of differences and similarities between all its object disciplines. The PSE Programme has not only contributed enormously to the interaction of European philosophers of specific sciences, but also very much to this comparative nature of the field by the intensive exchange of theories and methods used by colleagues studying other disciplines. This deepens and strengthens PSE's basic contribution to the re-emancipation of philosophy of science in Europe relative, since decades, to the flourishing field in North America. In this respect, the PSE, and its two forerunners, functioned as very fruitful foster parents of the European Philosophy of Science Association (EPSA) and the European Journal for Philosophy of Science (EJPS). I am sure that the younger generations of philosophers of science in Europe will continue to directly and indirectly profit very much from all these PSE-efforts."

Professor Tomasz Placek (Steering Committee member)

Jagiellonian University, Krakow, Poland

"The ESF Programme was exceptional in helping to integrate philosophers from the formerly Soviet-

dominated part of Europe with their Western colleagues. Surprisingly, more than twenty years after the political changes, the remnants of the divide are still present, as witnessed by relatively little presence of Central European philosophers at philosophical events in Europe. As a result of the Programme, a handful of Polish philosophers of science, either those who are already accomplished or just starting their careers, had an opportunity to read, or to comment on, a paper, or to participate in the discussions. I'm sure that their participation in the events of the Programme made a positive impact on their academic work and their teaching."

Professor Demetris Portides (Steering Committee member)

University of Cyprus, Nicosia, Cyprus

"The Philosophy of Science in a European Perspective (PSE), an ESF Research Networking Programme, is coming to an end in April 2013. In the five years of its existence PSE has made significant contributions in several important ways. It brought together Philosophers of Science from most European countries, some of whom used to function as isolated entities in their own inconsequential communities. For small countries like Cyprus, with a minute philosophical community, this was particularly important in all respects. But also this particular contribution had an indirect impact on the evolution of the European Philosophy of Science Association, by facilitating an increase of the latter's membership and also facilitating its goal of expansion to include Philosophers of Science from all European countries. Because this was achieved by organising two major conferences and about fifteen workshops, PSE functioned as a network that placed particular emphasis on academic research and its promotion, and on the exchange of research ideas among the participants in the conferences and workshops. This focus is well corroborated by the published series of forthcoming volumes that have been the tangible product of PSE. If one takes into account that PSE operated with a narrow budget throughout the five years of its existence then this achievement is praiseworthy. I believe PSE managed to achieve all this because its Chair, Maria Carla Galavotti, worked in close cooperation with the Steering Committee members and the five team leaders with a sole goal in mind: to bring together philosophers of science from all European countries thus making possible the exchange of philosophical and scientific ideas."

Professor Wlodek Rabinowicz (Steering Committee member)

University of Lund, Sweden

"The single most important achievement of the research programme Philosophy of Science in Europe can be put in just a few words: this programme has managed to give back to Europe its central position in the field - a position European philosophy lost in the 1930s, in the course of events leading to the Second World War. Or, at least, it has managed to demonstrate that Europe has now regained this central position. The meeting and conferences organised by the programme testified to the multifaceted developments going on in various European centres of research, to the high level of mutual cooperation and to the astounding dynamics of this process. The leader of the programme, Maria Carla Galavotti, has done a tremendous job in keeping all the threads together. The research output has been collected in a number of impressive volumes. As for the conferences themselves, two of them in particular have left a lasting impression: the congress in Vienna, organised together with the Institute Vienna Circle, and the final programme conference in Bertinoro. Both were truly glorious events."

Professor Friedrich Stadler (Steering Committee member)

Director, Institute Vienna Circle, Austria

"The Institute Vienna Circle (IVC) has been a supporting institution of 'The Philosophy of Science in a European Perspective' (PSE) since the Programme began. On behalf of the IVC, and as a Steering Committee member, I can say that the overall outcome of the PSE has been positive. The PSE's activities began with the Opening Conference, organised by the IVC together with PSE in 2008 at the University of Vienna. The meeting addressed PSE's aim of setting the background for a collaborative project on European philosophy of science by creating research structures and developing networks across Europe. Dealing with the general topic 'the present situation in the philosophy of science', the intention was to identify traditions and institutions already present, and to point to the directions in which future investigations were to be focused. This conference was the beginning of a promising interdisciplinary approach of networking and cooperation in the philosophy of science all over Europe, involving many renowned scientists as well as younger gifted philosophers of science, grouped in five research teams. The general themes pursued within the frame of 'European philosophy of science'

dealt with the historical aspects of the 'European perspective', linked to the meaning of a specific European identity, its deep historical roots and continuing traditions in modern philosophy of science. In the following years the five teams organised separate workshops related to annual topics from their specific perspective. The status quo of philosophy of science after the 'socio-historical turn' is characterised by plurality and specialisation all over the world. The European perspective in philosophy of science fosters the inclusion of the historical roots of current debates and the focus on methodological problems that cross the various sub-disciplines. These efforts opened a concomitant reflection on what philosophy of science in Europe and European philosophy of science mean, and how this awareness could help philosophers interpret and motivate their research through a stronger collective identity. After the transatlantic interaction and transformation, and the 'return' after World War II, this pluralistic perspective raised the question of contemporary European characteristics in the philosophy of science. After five years of productive networking we are now enjoying a strengthened and growing research field in philosophy of science in Europe, with EPSA as an ongoing association and an additional new book series currently emerging from the PSE Programme."

Professor Dennis Dieks (Team D leader)

Utrecht University, The Netherlands

"When one is part of an ongoing process it is always difficult to discern what exactly is being achieved: one easily drowns in the details of day to day affairs. But now looking back at five years of PSE, from Team D's perspective (philosophy of the physical sciences), it is easier to take stock and see the contours of what has been achieved. Without any doubt, part of the agenda of my research field has been determined by the activities organised under the umbrella of the PSE Programme. The coherence among researchers has benefitted enormously from these activities, and several new research directions have received a great stimulus. My own research of the past few years has been substantially shaped by presentations to be given at PSE meetings and by the writing of papers based on these presentations. This, it seems to me, is exactly what was intended and hoped for; I can therefore only come to the conclusion that PSE has been a huge success."

Professor Wenceslao J. Gonzalez (Team C leader)

University of A Coruña, Spain

"An overall evaluation of the programme 'The Philosophy of Science in a European Perspective' shows important achievements from different angles. First, the PSE Programme has created a relevant network of relations between European scholars, which stresses the intellectual bonds among philosophers, and so boots the European identity. Second, there has been a clear development of a European Perspective on Philosophy of Science, which was very noticeable during the workshops organised as well as in the books already published by Springer. Third, the philosophy of cultural and social sciences - the field of Team C - has expanded the topics of discussion, enlarging the area of analysis to include issues in the philosophy of the sciences of the artificial. In addition, the workshops organised by Team C (held in Vienna, Amsterdam, Ferrol, Bucharest and Bologna) have offered a deeper analysis of traditional topics of the philosophy of social sciences. Fourth, the PSE Programme has contributed to the expansion of the philosophy of science in Spain. Consequently, thanks should be given to the European Science Foundation for making these achievements possible. This also involves recognition to the Steering Committee of the Programme (especially to its Chair) as well as to the Team leaders of the Programme."



Evening lecture by Patrick Suppes, Bertinoro 2012. Photo courtesy of Maria Carla Galavotti

► PSE website: www.pse-esf.org

