

# Lorentz Center

International Center for workshops in the Sciences

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## Understanding and the Aims of Science

from 31 May 2010 through 4 Jun 2010

### Program

All lectures take place in room 201 of the Huygens Building, unless otherwise mentioned. Each lecture consists of about 35 min. talk and 10 min. discussion.

The presentations by young scholars take place in room 201 and room 335 on the Lorentz Center floor.

#### Monday May 31: Aims of Science and the Place of Understanding

- 09.00 – 10.00 Arrival and registration
- 10.00 – 10.15 Introduction by Lorentz Center staff
- 10.15 – 10.30 **Henk de Regt**: Introduction to the workshop
- 10.30 – 11.15 **F.A. Muller and Antigone Nounou**: *Understanding with and without explanation*
- 11.15 – 11.45 Coffee break
- 11.45 – 12.30 **Herman Verlinde**: *Horizons of Understanding of Space and Time*
- 12.30 – 13.30 Lunch break
- 13.30 – 14.00 Discussion
- 14.00 – 14.30 Discussion: formulating questions and aims for the workshop  
(moderators: **James McAllister & Henk de Regt**)
- 14.30 – 15.15 **Jan Faye**: *Understanding and interpreting quantum mechanics*
- 15.15 – 15.45 Tea break
- 15.45 – 16.30 **Dennis Dieks**: *Understanding and explanation in physics*
- 16.30 – 17.00 Discussion
- 17.00 – 19.00 Wine and cheese welcoming party

#### Tuesday June 1: Theories of Understanding I: Mechanism-Based Approaches

- 09.15 – 09.30 **James McAllister**: *Introduction to today's topic*
  - 09.30 – 10.15 **Lindley Darden**: *Mechanistic understanding in the life sciences: cases from molecular and evolutionary biology*
  - 10.15 – 10.45 Coffee break
  - 10.45 – 11.30 **Gerard Nienhuis**: *Quantum optics as a mechanistic understanding of light*
  - 11.30 – 12.00 Discussion
  - 12.00 – 13.00 Lunch break
  - 13.00 – 13.40 **Herman Verlinde**: *Lorentz Center Highlight* in Sitterzaal (ground floor, left of the main entrance with the revolving doors)
  - 14.00 – 14.20 Presentations by young scholars \*
- Room 335: **Attilia Ruzzene** *Causal inference in the social science. Why*

	<i>causal mechanisms matter and how to find out about them</i>
	Room 201: <b>Raoul Gervais</b> <i>A pragmatic theory of scientific explanation</i>
14.25 – 14.45	Presentations by young scholars*
	Room 335: <b>Bart Karstens</b> : <i>The Tense Relation between Understanding and Evaluation in the History of Science</i>
	Room 201: <b>Daniele Molinini</b> : <i>A Practice Driven approach to MEPP in terms of Conceptual Tools and Conceptual Resources</i>
14.45 – 15.15	Tea break
15.15 – 16.00	<b>Stephen Turner</b> : <i>Where explanation ends: understanding as the place the spade turns in the social sciences</i>
16.00 – 16.45	<b>Frank Hindriks</b> : <i>Idealization, mechanisms, and understanding in economics</i>
16.45 – 17.30	Discussion
17.45	Departure by bus to boat
18.00 – 22.00	Boat trip and dinner
22.00	Departure bus via Central Station and Hotel <i>Het Haagsche schouw</i> to Lorentz Center

\* In two parallel sessions, two Ph.D. students or recent Ph.D's will be asked to prepare a 20min presentation about their Ph.D research. Senior researchers will be asked to attend one of these sessions.

### Wednesday June 2: Theories of Understanding II: Unification- and Reduction-Based Approaches

09.15 – 09.30	<b>Henk de Regt</b> : <i>Introduction to today's topic</i>
09.30 – 10.15	<b>Victor Gijssbers</b> : <i>Unification and understanding</i>
10.15 – 10.45	Coffee break
10.45 – 11.30	<b>Michael Strevens</b> : <i>Explanatory Autonomy and Explanatory Irreducibility</i>
11.30 – 12.00	Discussion
12.00 – 13.30	Lunch break
13.30 – 13.50	Presentations by young scholars*
	Room 335: <b>Rogier Kievit</b> <i>Understanding and the aims of cognitive neuroscience</i>
	Room 201: <b>Leo Pape</b> <i>Compression-driven progress in science</i>
13.50 – 14.10	Presentations by young scholars *
	Room 335: <b>Merel Lefevere</b> <i>A search for non-reductive unification</i>
	Room 201: <b>Ioannis Votsis</b> <i>Thinking about Scientific Understanding and Explanation as a Structural Realist</i>
14.15 – 15.00	<b>Maarten G. Kleinbans</b> : <i>A feeling for patterns in rivers: understanding and reductionist explanation in earth science</i>
15.00 – 15.30	Tea break
15.30 – 17.00	Plenary discussion on:
	- Mechanism based approaches versus unification- and reduction-based approaches
	- Outstanding problems and future prospects
	- What can scientists and philosophers learn from each other?
	(moderator: <b>Lindley Darden</b> )

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### Thursday June 3: Simulations and the Provision of Understanding

- 09.15 – 09.30      **Henk de Regt**: *Introduction to today's topic*
- 09.30 – 10.15      **Rafaela Hillerbrand**: *The epistemology of computer simulations: Three types of understanding*
- 10.15 – 10.45      Tea break
- 10.45 – 11.30      **Wendy Parker**: *Simulation and understanding in the study of weather and climate*
- 11.30 – 12.00      Discussion
- 12.00 – 13.30      Lunch break and informal discussion
- 13.30 – 14.15      **Petri Ylikoski**: *Agent-based simulation and sociological understanding*
- 14.15 – 14.30      Discussion
- 14.30 – 15.00      Tea break
- 15.00 – 15.45      **Sabina Leonelli**: *Understanding data in the digital age: experimental biology in silico*
- 15.45 – 16.00      Discussion
- 16.00 – 17.00      Discussion: What kind of understanding can simulations provide, if any?  
(moderator: **Wendy Parker**)
- 18.15                  Departure by bus to restaurant Scheltema
- 18.30 – 21.00      Workshop dinner at restaurant [Scheltema](#)

### Friday June 4: Understanding, Imagination, and Visualization

- 09.15 – 09.30      **James McAllister**: *Introduction to today's topic*
- 09.30 – 10.15      **James R. Brown**: *What do we see in a thought experiment?*
- 10.15 – 10.45      Coffee break
- 10.45 – 11.30      **Sander Bais**: *The pictorial languages of theoretical physics*
- 11.30 – 12.00      Discussion
- 12.00 – 13.30      Lunch break and informal discussion
- 13.30 – 14.15      **William Bechtel**: *Visualizing complex dynamic mechanisms in biology*
- 14.15 – 15.00      **Henk de Regt**: *Visualization as a tool for scientific understanding*
- 15.00 – 15.30      Tea break
- 15.30 – 16.15      Wrap up session: Two perspectives on scientific understanding - scientists and philosophers summarize and evaluate the results of the workshop  
(moderator: **Jim Brown**)

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