Gila Hanna, Toronto
Hans Niels Jahnke, Essen
Helmut Pulte, Bochum

Explanation and Proof in Mathematics: Philosophical and Educational Perspectives
Universität Duisburg-Essen, Campus Essen, Nov. 1 through Nov. 4, 2006
Conference Program

Conference Place
Bildungszentrum für die Entsorgungs- und Wasserwirtschaft GmbH
Wimberstr. 1
D-45239 Essen-Heidhausen

http://www.bew.de/bew/bew_essen/
General remark: The presentations should not exceed 40 minutes; at least 20 minutes should be left for discussion

October 31  Travel day
20.00  Opening dinner

November 1

Morning session:

08.30 – 09.00  Welcome and introduction

Section 1: The role of representations and diagrams in proof

09.00 – 10.00 Marcus Giaquinto (University College London, London), *A false dichotomy: algebraic vs geometric thinking in mathematics*

10.00 – 11.00 Mary Catherine Leng (Cambridge university), *Mathematical Proof: An Algebraic Perspective*

11.00 - 11.30 coffee break

11.30 – 12.30 Evelyne Barbin (Université de Nantes): *Proofs of the main proposition on geometrical proportion: from icons to symbols*

Afternoon session

14.30 – 15.30 Willibald Dörfler (Universität Klagenfurt): *Verbal argumentation as talk about diagrams*

Section 2: Proofs as experiments and their role in the empirical sciences

15.30 – 16.30 Alfred Nordmann (Technische Universität Darmstadt): *Proof as Experiment in Wittgenstein*

16.30 – 17.00 coffee break

17.00 – 18.00 Moritz Epple (Universität Frankfurt): *Vague intuition vs. rigorous proof? Ways of argument in topology in late 19th and early 20th century.*

18.00 – 19.00 Teun Koetsier (Vrije Universiteit Amsterdam), *Motion and geometry in antiquity*
November 2

Morning session:

Section 2: Proofs as experiments and their role in the empirical sciences (continued)

08.30 – 09.30 Michael Stöltzner (Universität Wuppertal): *The principle of least action as a mathematical thought experiment*

09.30 – 10.30 Kazuhiko Nunokawa: *Explanations in mathematical problem solving*

10.30 – 11.00 coffee break

11.00 – 12.00 Michael D. de Villiers (University of Durban Westville): *Baking a mathematical pudding: what's the role of proof and experimentation?*

Afternoon session

14.00 – 15.00 Round Table 1: Proofs, diagrammatic thinking and empirical contexts (Moderator Helmut Pulte)

Section 3: Genesis, epistemological functions and social practices of proof

15.00 – 16.00 Kenneth Ruthven (University of Cambridge): *What needs explaining in classroom mathematics? What functions (h)as proof?*

16.00 – 16.30 coffee break

16.30 – 17.30 Aiso Heinze (Universität München): *On the acceptance of mathematical proofs: Observations about social processes in the mathematical community and possible implications for the mathematics classroom*

17.30 – 18.30 Jean Paul van Bendegem (Vrije Universiteit Brussel), What *Turns an Argument into a Proof?*
November 3

Morning session

Section 3: Genesis, epistemological functions and social practices of proof (continued)

08.30 – 09.30 Thomas Mormann (University of the Basque Country, San Sebastian): Proof and Idealization in Mathematics

09.30 – 10.30 Nicolas Balacheff (Laboratoire Leibniz Grenoble): Bridging knowing and proving: the complexity of the epistemological genesis of mathematical proof

10.30 – 11.00 coffee break

11.00 – 12.00 Brendan Larvor (University of Hertfordshire de Havilland Campus): What can Lakatos teach about teaching?

Afternoon session

14.00 – 15.00 Phil Davis (Brown university): Why do I believe a theorem?

14.00 – 16.00 Round Table 2: The cultural meaning of proof (Moderator Hans Niels Jahnke)

Afternoon

Visit of the Abbey of Werden and walk along the Ruhr river
November 4

Morning session

Section 4: Proof and mathematical understanding. Different types of argumentation and proof

08.30 – 09.30 Karine Chemla (CNRS Paris): *Understanding, proving and the description of algorithms in the Book of mathematical procedures from China (ca 186 BCE)*

09.30 – 10.30 Mariolina Bartolini-Bussi (Università di Modena): *Contexts for Approaching at Validation: The Function of Artefacts of Ancient Technologies*

10.30 – 11.00 coffee break

11.00 – 12.00 Maria Alessandra Mariotti (Università di Siena): *Contexts for Approaching at Validation: The Function of Artefacts of Information Technologies*

Afternoon session

14.00 – 15.00 Michael Neubrand (Universität Oldenburg): *Proving as Part of Mathematical Achievement: Concepts and Results from the PISA Study*

15.00 – 16.00 David Tall (University of Warwick): *The Cognitive Development of Different Types of Reasoning and Proof*

16.00 – 16.30 coffee break

16.30 – 17.30 Erich Christian Wittmann (University of Dortmund): *Operative Proofs*

17.30 – 18.30 *Round Table 3: Proof and explanation* (Moderator Gila Hanna)

November 5

Travel day
List of contributions

Section 1: The role of representations and diagrams in proof

Marcus Giaquinto (University College London, London), A false dichotomy: algebraic vs geometric thinking in mathematics
Evelyne Barbin (Université de Nantes): Proofs of the main proposition on geometrical proportion : from icons to symbols
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Kazuhiko Nunokawa (Joetsu University of Education, Tokyo), Explanations in mathematical problem solving
Michael D. de Villiers (University of Durban Westville): Baking a mathematical pudding: what's the role of proof and experimentation?

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Round Table 1: Proofs, diagrammatic thinking and empirical contexts (Moderator Helmut Pulte)

Round Table 2: The cultural meaning of proof (Moderator Hans Niels Jahnke)

Round Table 3: Proof and explanation (Moderator Gila Hanna)