

## Martin Mose Bentzen | Curriculum Vitae



---

Home address: Tystrupvej 40, 4250 Fuglebjerg, Denmark

Telephone number: +45 29932576

e-mail address: mmbe@dtu.dk

url: <http://www.martinmosebentzen.dk>

---

**Areas of specialization: logic, machine ethics, philosophy of science**

### Education

- Jun 2010                      PhD, Philosophy, Roskilde University (Supervisors: Frank Veltman, Amsterdam, and Stig Andur Pedersen, Roskilde).
- 2006 – 2009                      PhD student, Institute for Logic, Language and Computation, (ILLC), University of Amsterdam and Philosophy and Science Studies, Department of Culture and Identity, Roskilde University.
- 2005                              PhD student, Institute for Logic, Language and Computation, University of Amsterdam.
- Sep 2004                        MA, History of Ideas and English, University of Aarhus.
- Jan 2002                        BA, History of Ideas, University of Aarhus.
- 1999                              Studies at Eberhard Karls Universität, Tübingen.
- 1997 - 2004                      Studies at the Department of the History of Ideas, (later the Department of Philosophy and the History of Ideas), University of Aarhus.
- 1996 - 1997                      Studies at Department for History of Religion at Copenhagen University.

### Employment

- Feb 2017 - present              Associate Professor in the area Theory of Science in Engineering, Department of Management Engineering, Technical University of Denmark.

Oct 2013 – Feb 2017	Assistant Professor in the area Theory of Science in Engineering, Department of Management Engineering, Technical University of Denmark.
Jan 2016 - present	Freelance writer for “Illustreret Videnskab” (Popular science magazine).
2010	Teaching Assistant, Faculty of Health and Medical Sciences, University of Copenhagen.
Aug 2009 - Jan 2014	Part-Time Lecturer, Department of Culture and Identity, Roskilde University.
Oct 2009 - Oct 2013	High School Teacher, Philosophy and English, Sorø Akademi.

## Languages

Danish (native speaker), English (fluent), German (intermediate), Latin (basic), Ancient Greek (basic).

## Publications (I am the sole author unless otherwise indicated)

### *Peer reviewed papers and book chapters*

1. Lindner, F. Bentzen, M.M. “A Formalization of Kant’s Second Formulation of the Categorical Imperative”, Proceedings of the 14th International Conference on Deontic Logic and Normative Systems (DEON), 2018.
2. Lindner, F., Bentzen, M.M., Nebel, B., “The HERA Approach to Morally Competent Robots”, In *Proceedings of the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017)*. 2017.
3. Lindner, F., Wächter, L., Bentzen, M.M. “Discussions About Lying With An Ethical Reasoning Robot”, In *Proceedings of the 2017 IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN 2017)*. 2017.
4. Kuhnert, B., Lindner, F., Bentzen, M.M., Marco Ragni, M., “Perceived Difficulty of Moral Dilemmas Depends on Their Causal Structure: Preliminary Results and a Formal Model”, In *Proceedings of the 39th Annual Meeting of the Cognitive Science Society CogSci 2017*. 2017.
5. “The Limits of Logic-Based Inherent Safety of Social Robots”, *Philosophy and Engineering: Exploring Boundaries, Expanding Connections*, Editors: Diane P. Michelfelder, Byron Newberry, Qin Zhu, Springer, 2017.
6. "Black Boxes on Wheels - Research Challenges and Ethical Problems in MEA-based Robotics", *Ethics and Information Technology*, 19(1): 19-28, 2017.
7. "The principle of double effect applied to ethical dilemmas of social robots", *Robophilosophy 2016/TRANSOR 2016*, IOS Press, 2016.
8. "Action Type Deontic Logic", *Journal of Logic, Language and Information*, 23(4): 397-414, 2014.
9. "Brains on Wheels: Theoretical and Ethical Issues in Bio-Robotics", in *Sociable Robots and the Future of Social Relations*, *Frontiers in Artificial Intelligence and Applications* Volume: 273, Editors: Johanna Seibt, Raul Hakli, Marco Nørskov: 245 - 251, IOS Press, 2014.
10. "Deontic Reasoning with Incomplete Trust", *Logique et Analyse*, 54, Nr. 215: 327-342, 2011.
11. "Ross' Paradoks" in *Alf Ross - Kritiske gensyn*, DJØF Forlag, 2006.

*Other scientific publications*

12. "Moral Permissibility of Actions in Smart Home Systems", (with Felix Lindner, Louise Dennis and Michael Fisher). In Proceedings of the FLoC 2018 Workshop on Robots, Morality, and Trust through the Verification Lens (extended abstract and poster). 2018.
13. "Logic without unique readability - a study of semantic and syntactic ambiguity", *Bulletin of Symbolic Logic* (abstract, accepted).
14. "The Ineliminable Distortion of Reality: On Causality, Representation, Abstraction and Idealization in Batterman's Philosophy of Science", Nordic Network on Philosophy of Science meeting, Copenhagen, 20-21 April 2017 (extended abstract).
15. "The Hybrid Ethical Reasoning Agent IMMANUEL" (with Felix Lindner, Freiburg), In *Proceedings of the 2017 Conference on Human-Robot Interaction (HRI2017), Late Breaking Report*. 2017.
16. "CADILLAC Workshop, 23-25 May", *The Reasoner*, Volume 10, issue 11, pp. 94-95, 2016 (report from the workshop).
17. "User Innovators in the Smart Energy Transition" (with Sophie Nyborg, Kristian Borch, and Ghita Dragsdahl Lauritzen), XXVII ISPIM Innovation Conference, 2016 (abstract).
18. "The double effect principle applied to ethical dilemmas of social robots", *Dao, Logic and Epistemology*, Jin Yuelin Conference, 2015 (extended abstract).
19. "Interventions at the core of scientific reasoning – on de-idealizing and re-idealizing formal logic", European Philosophy of Science Association Conference 2015 (extended abstract).
20. "The limits of logic based inherent safety of social robots", Forum on Philosophy, Engineering and Technology, 2014 (extended abstract).
21. "Deontic reasoning and moral responsibility with incomplete trust". *PhDs in Logic*, 2009 (extended abstract).
22. "Beslutningsdygtig teknologi - om autonome sociale robotter og moralsk ansvar", *Filosofi*, issue 2, pp. 8-16, 2014 (journal article).
23. Review of "Handbook of Modal Logic", *Studia Logica*, vol. 96(1), 2010.
24. "Stit, Iit, and Deontic Logic for Action Types", PhD dissertation, 2010.
25. "Åbn døren for den automatiske dommer", and "Retspolitisk Udfordring" in *Gode råd og løftede pegefingre til jurastuderende*, Århus Universitetsforlag, 2008 (book chapter).
26. "Is the Answer to this Question No?", in *The Reasoner*, September, 2007 (web publication).
27. "Deontic Logics and Imperative Logics - A Historical Overview of Normative Logics from Ernst Mally to Defeasible Deontic Logic and a New System", MA Thesis, 2004.

*Popular Articles (in Danish, Selected)*

28. "Kun én mand forstår verdens sværeste bevis", *Illustreret Videnskab*, pages: 38-41, August 25, 2016
29. "Vi lægger livet i robotters hænder: Tør vi?", *Illustreret Videnskab*, vol: 8, pages: 20-25, 2016.
30. "Ethiske robotter vil gøre verden til et bedre sted", *Ingeniøren*, April 21, 2015.
31. "The Imitation Game: Alan Turings enigmatiske imitationsspil", *videnskab.dk*, January 12, 2015.
32. "Bilens dilemma", *Weekendavisen*, September 19, 2014.
33. "Rottehjerne på hjul", *Weekendavisen*, April 11, 2014.
34. "Ingeniører er dybest set skabsetikere", *Ingeniøren*, March 6, 2014.
35. "Vi har selv designet naturens love", *videnskab.dk*, January 13, 2014.
36. "Yes, Master", *Weekendavisen*, May 24, 2013.
37. "Hospitalsrobotter", *Weekendavisen*, April 5, 2013.

38. "Dræberrobotter: Utopien om krig uden døde kan ende i moralsk tomrum", *Kristeligt Dagblad*, March 14, 2013.
39. "Når robotterne kommer, vil de så opføre sig ordentligt?", *Ingeniøren*, February 22, 2013.

### Selected presentations (I am the sole author unless otherwise indicated)

1. "A Formalization of Kant's Second Formulation of the Categorical Imperative" (w. Felix Lindner), ISAIM 2018, Florida, USA, January 3-5, 2018.
2. "Formal Ethics for Social Robots", Verification and Validation of Autonomous Systems: Ethical, Social and Trustworthy behavior, Cumberland Lodge, England, November 23-24, 2017.
3. "Formal Ethics for Social Robots", Freiburg University, November 13, 2017.
4. AI and Ethics, at IDA, Afdeling Randers, October 31, 2017.
5. Talk about AI and ethical Robots (part of a course taught with Thomas Bolander, DTU Compute and Ole Ravn, DTU Elektro) at "Folkeuniversitet, København", October 10, 2017.
6. Social Robots for University Learning, High Tech Summit, DTU, September 21, 2017.
7. Presentation at IROS 2017, Vancouver, Canada (authors: F. Lindner, M.M. Bentzen., B. Nebel. Presenter: F. Lindner), September 24–28, 2017.
8. "Autonomous Vehicles - Ethical Issues", Transport Summer Summit DTU 2017, May 31, 2017.
9. "Towards Hybrid Ethical Reasoning Agents" (joint work with Felix Lindner), Dansk Filosofisk Selskabs Årsmøde, Aarhus University (Copenhagen campus), March 4, 2017.
10. "How to build ethical AI", DTU Compute, Technical University of Denmark, February 16, 2017.
11. Participated in panel discussion about ethical robots at "Velfærdens Innovationsdag", Øksnehallen, Copenhagen, January 26, 2017.
12. "The principle of double effect applied to ethical dilemmas of social robots" at Robophilosophy 2016/TRANSOR 2016, Aarhus University, October 20, 2016.
13. "Towards a theory of causal agency for formal ethics", CADILLAC workshop, Christiania, Copenhagen, May 23, 2016.
14. "Ethiske dilemmaer med selvkørende biler", Hvordan baner vi vejen for selvkørende biler?, Event at Forskningens døgn, Copenhagen, April 25, 2016.
15. "Sociale robotter", lecture, Policyforum, University of Copenhagen, March 17, 2016.
16. "Constructing and Evaluating Models in Physics and in the Engineering Sciences" (with Stig Andur Pedersen), DFS annual meeting, University of Copenhagen, March 4, 2016.
17. "The double effect principle applied to ethical dilemmas of social robots", Dao, Logic and Epistemology, Tsinghua University, China, October 19, 2015.
18. "Resituating research objects and model objects within the philosophy of science", Symposium on the retirement of Prof. Stig Andur Pedersen: Scientist, Philosopher and Very Human, Roskilde University, October 2, 2015.
19. "Interventions at the core of scientific reasoning – on de-idealizing and re-idealizing formal logic", European Philosophy of Science Association Conference (EPSA15), Heinrich Heine University Düsseldorf, Germany, September 23, 2015.
20. "How to make an ethical robot - the double effect principle applied to robot dilemmas", Dansk Filosofisk Selskabs Årsmøde 2015, Aarhus University, March 6, 2015.
21. "Further steps towards ethical robots: the double effect principle formalized and applied to ethical dilemmas", TRANSOR Workshop I: Methodological Problems of Social Robotics, Aarhus University, January 28 -January 30, 2015.
22. "Black Boxes on wheels: methodological and ethical problems in biological AI", 2nd Annual Meeting of the Danish Network in Philosophy of Science, Hotel Nyborg Strand, January 23 - January 24, 2015.
23. "The principle of double effect applied to thought experiments in ethics - a formal approach", Workshop on Formalised Social Intelligence, Technical University of Denmark, December 18, 2014.
24. "Starting project HERA - Hybrid Ethical Reasoning Agents", Friends by Design Network Workshop, University of Southern Denmark, October 1, 2014.
25. "Brainson Wheels-theoretical and ethical issues in bio-robotics", Robo-Philosophy 2014, Sociable Robots and the Future of Social Relations, University of Aarhus, August 20, 2014.
26. "The Limits of Logic-Based Inherent Safety of Social Robots", Forum on Philosophy,

- Engineering and Technology, Virginia Tech, USA, May 28, 2014.
27. "Deontic reasoning and deontic logic", Modality and Modalities 2014, Lund University, Sweden, May 23, 2014.
  28. "Logic and Social Robots", The 2014 Nordic Network for Philosophy of Science (NNPS) Meeting, Lund University, Sweden, March 28, 2014.
  28. "Limits of Logic-Based Inherent Safety for Social Robots", Active Friends and Friendly Actions, Friends by Design network, University of Hamburg, February 25, 2014.
  29. "Action Type Deontic Logic for Ethical Robots, Making Friends Workshop - Ontological and Ethical Aspects of Personal Robots, University of Aarhus, June 18, 2013.
  30. "Action Type Deontic Logic for Ethical Robots", Modality and Modalities, Roskilde University, May 24, 2013.
  31. "Deontic logic for robot ethics: foundations and applications, Dansk Filosofisk Selskabs Årsmøde, University of Southern Denmark, March 8, 2013.
  32. "The Ontology of Actions", Research Colloquium in Theoretical Analytical Philosophy, University of Aarhus, November 30, 2012.
  33. "Robot Ethics and Deontic Logic", Workshop on Conditions for normative agency, University of Aarhus, August 23, 2012.
  34. "Action Type Deontic Logic", Modality and Modalities, University of Copenhagen, May 30, 2012.
  35. "Modeling the Responsibility of Legal or Moral Agents", Seminar on logics for multi-agent systems, Danish Technical University (DTU), April 12, 2010.
  36. "Mind Altering Devices and Assassins with Trembling Hands", Dansk Filosofisk Selskabs Årsmøde 2009, University of Aarhus, February 28, 2009.
  37. "Deontic Reasoning and Moral Responsibility with Incomplete Trust", PhDs in Logic, University of Ghent, Belgium, February 19, 2009.
  38. "Stit Theory, Responsibility, and Uncertainty", ISIS, Utrecht University, December 3, 2008.
  39. "Judging Free Agents - Towards a Formal Theory of Responsibility", Logic Tea, ILLC, University of Amsterdam October 27, 2008.
  40. "Dynamic Deontic Logic, Part 1 +2", Logic Seminars, Roskilde University, October 22 and November 26, 2008.
  41. "Responsibility Formalized", Second Workshop in Decisions, Games & Logic, ILLC, University of Amsterdam, July 2, 2008.
  42. Poster presentation at The Dynamics of Preferences and Intentions, ILLC, February 28, 2008
  43. "Applying for Residence Permit in Denmark -A Logical Analysis of Legal Texts and Legal Practice", RUC-ILLC workshop on Deontic Logic, November 8, 2007.
  44. "Single Moment Stit Theory", RUC-ILLC Workshop on Formalizing Actions, University of Roskilde, June 22, 2007.
  45. "Den automatiske dommer", Retskritisk Forum, University of Aarhus, April 27, 2007.
  46. Forpligtelser over tid givet viden", DFS årsmøde, Roskilde University, March 2, 2007.

### *In the media (selected)*

1. Interviewed about social robots, Kulturen på P1, P1, Danmarks Radio, May 15, 2018.
2. "Forsker: Krigsrobotter skal lære etik fra de store filosoffer", Jyllandsposten, April 17, 2018.
3. "Kan vi lære robotter at handle etisk i krig?", Interview for article, videnskab.dk, April 15, 2018.
4. Interview for podcast and short article about ethics for robots, videnskab.dk, April 14, 2018.
5. Debated ethical standards for social robots, TV2 News, April 9, 2018.
6. Interviewed by Berlingske Tidende about AVs, March 20, 2018.
7. Interviewed by TV2 News about AVs, March 19, 2018.
8. Interviewed about my research into ethical dilemmas of AVs, DTU Avisen, March, 2018.
9. Article about our research into social robots as teaching assistants, DTU Avisen, March, 2018.
10. Interviewed about Asimov's laws and robot empowerment in AK27, Radio24syv, August 30, 2017.
11. Interviewed about German ethical principles for autonomous cars, DR 2 Dagen (Danish National Television), August 29, 2017.
12. "Ny teknologi rejser etiske dilemmaer: Robotter skal have moralsk kompas" Nordea Invest, May 30, 2017.

13. "Slip rattet og fjern foden", BT, May 17, 2017 (Interviewed by Danish newspaper).
14. "Ethiske robotter og biler", Harddisken, DR P1, February 24, 2017 (Interviewed by Danish National Radio).
15. "Hmm. Hvem skal dø: en topchef, en hjemløs eller et barn? Nu skal robotter træffe etiske dilemmaer", zetland.dk, February 20, 2017 (Interviewed by Danish web based magazine).
16. "Robotter har brug for etik - men hvilken?" Ingeniøren, January 27, 2017 (Interview).
17. "Kunstig intelligens skal tæmmes", Ugebrevet Mandag Morgen, January 23, 2017 (Interview).
18. "Robotterne skal opdrages ordentligt", Når teknologien tager over, giver det plads til mennesket, særnummer om robotter og kunstig intelligens, Ugebrevet Mandag Morgen, November 7, 2016 (Interview).
19. "Ville du købe en bil, der var programmeret til at slå føreren ihjel?" Berlingske Business, October 30, 2016 (Reprint of article from IDA Universe).
20. "Selvkørende biler og etik: Ville du købe en bil, der var programmeret til at slå føreren ihjel?" IDA Universe, October 24, 2016 (Interviewed for newsletter and blog hosted by the Danish Engineering union,
21. "Snart kommer de selvkørende biler", Danmarks Radio, 21 Søndag, August 21, 2016 (Interviewed by Danish national television).
22. "Hvor meget ansvar er vi klar til at give den selvkørende bil?", Information, April 25, 2016 (Interviewed by Danish Newspaper).
23. "Hvad gør vi, når maskiner har højere moral end mennesker?", Interview by Føljeton, (Danish web based newspaper), February 18, 2016.
24. Du lægger ud som Luke Skywalker – hvordan undgår du at ende som Darth Vader?", Ingeniøren, January 1, 2016 (interviewed by Danish weekly magazine for engineers).
25. Appeared as expert on social robots on Danish National Radio in the program Netværket, (DR P1), September 3, 2015.
26. "Nyt robothotel udfordrer vores menneskelighed", Kristeligt Dagblad, May 27, 2015 (interviewed by Danish newspaper).
27. Debated ethical robots on Radio24syv in the program AK 24syv, September 17, 2014.
28. Interviewed about ethics and robots on Danish national radio in the program Gandhi (DR P3), June 4, 2014.
29. "Er det etisk forsvarligt at lave robotter, der er ligesom mennesker?" Kristeligt Dagblad, February 14, 2014 (interviewed by Danish newspaper).

## Academic Teaching Experience

### *Courses taught*

1. Philosophy of Science in Engineering, BA course, Technical University of Denmark (course responsible) (Autumn 2013 - present).
2. Advanced Research Methods in Engineering Management (with colleagues from DTU Management Engineering), PhD course, module on causal modeling and logic (Spring 2016, Spring 2017).
3. Introduction to Good Scientific Practice in Environmental Technology, (with Prof. Peter Steen Mikkelsen), PhD Course, module on Scientific Modeling, Technical University of Denmark (Spring 2015, spring 2016, Spring 2017).
4. Teach the Teachers: Modeling in Physics (with Prof. Stig Andur Pedersen), course for scientific staff, Technical University of Denmark (Spring 2015).
5. Theory of Science in Medicine (with Ass. Prof. Jan Kyrre Berg Friis), BA course, University of Copenhagen (2010).
6. Research seminar on category theory (with Prof. Stig Andur Pedersen and Ass. Prof. Klaus Froyin Jørgensen), Roskilde University (2008).

### *Examples of topics of projects and BA theses supervised at Roskilde University (2006-2014)*

The interpretation of quantum mechanics, computability theory and philosophy, ethical implications of robots in health care, ethical implication of addiction to mobile phones, Parfit's theory of identity, the epistemology of peer disagreement, theory of science in medicine, property rights of digital works in a philosophical perspective, the European Union and political philosophy, etc.

## Other Teaching Experience

Course about social robots and AI, Folkeuniversitetet København, 2017 (with K. Ravn and T. Bolander), 2018 (with K. Ravn and J. Villadsen). Course about 4<sup>th</sup> Industrial Revolution, Folkeuniversitetet København, Fall 2018. Course about Philosophy of Computer Science, Fall 2018.

High school teacher, 2009-2013.

## Service to the scientific community

### Reviewing

Reviewer for *Synthese*, *Studia Logica*, *Logica Universalis*, *Communications of the ACM*, *Robo-Philosophy (conference)*, *IROS (conference)*, *Nordic Network for Philosophy of Science (conference)*, *Journal of Applied Ethics and Philosophy*, *National Science Center Poland (grant proposals)*, *Science and Engineering Ethics*, *Philosophy and Technology*.

Expert in the area *logic* for the web encyclopedia *denstoredanske.dk*

### Organization

1. On the program committee for Robo-Philosophy 2018.
2. Organizer of the Robo-Philosophy session at the DFS annual meeting, University of Aarhus (Campus in Emdrup, Copenhagen), March 3-4, 2017.
3. Organizer of TIM research seminars, DTU (with P. Cash), 2016-2017.
4. Organizer of the C.A.D.I.L.L.A.C. Workshop , May 23-25, 2016 (with Thomas Bolander and Nina Gierasimczuk) .
5. Organizer of the session on the philosophy of technology at the DFS annual meeting, University of Copenhagen, March 4-5, 2016 (with Søren Riis and Stig Andur Pedersen).
6. Organizer of DTU workshop on Theory of Science in Engineering (with Martin Vigild), Technical University of Denmark, April 2015.
7. Organizer of DTU Management Engineering Workshop on Examinations: Best Practice (with Christine Ipsen and Signe Poulsen), Technical University of Denmark , April 2015.
8. Organizer of Seminars on the theory of science in Engineering, Technical University of Denmark, Autumn 2014.
9. On the program committee for Robo-Philosophy, University of Aarhus , 2014.
10. On the program committee for 2014 Nordic Network for Philosophy of Science (NNPS) Meeting , University of Lund, 2014.
11. Organizer of RUC- ILLC Workshop on Formalizing Actions , Roskilde University, June 2007.
12. *Organizer* of RUC-ILLC Workshop on Deontic Logic, Roskilde University, November 2007.

## Grants

1. Research visit fellowship for University of Liverpool, 2018, 900 GBP
2. Grant for Robots As Teaching Assistants (RATA), DTU Management Engineering, Technical University of Denmark, 42.000 Euros, 2017.
3. Grant for e-learning course development, Technical University of Denmark, 8.300 Euros, 2015.
4. Travel Grant, Otto Mønsted Foundation, 2014.
5. Internationalization Grant, PhD fellowship, The Danish Government, 2006-2009.
6. Erasmus Grant, the European Union, 1999.

## Memberships and affiliations

1. Member of the Association for Symbolic Logic
2. Member of the network Friends by Design -Formal Models for Human-Robot Interaction (former)
3. Member of TRANSOR.
4. Member of the Scandinavian Logic Society.
5. Member of Danish Network for Philosophy of Science (former).
6. Member of Nordic Network for Philosophy of Science.
7. Member of the European Philosophy of Science Association (former).