

ARTHUR PAUL PEDERSEN

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 phone +1 650.469.3561

RESEARCH INTERESTS Artificial Intelligence & Cognitive Science · Network Science & Social Networks
 Probability & Statistics · Logic & Computation · Decision & Game Theory · Economics
 Measurement Theory · Functional Analysis · Algebraic & Topological Systems

EDUCATION **Carnegie Mellon University**

Ph.D. Logic, Computation and Methodology (2012)

DISSERTATION *Archimedes Wake*
COMMITTEE Teddy Seidenfeld (advisor) · Kevin Zollman (advisor)
 Marcus Pivato (CY CERGY PARIS UNIV.) · Rohit Parikh (CUNY)

M.S. Logic, Computation and Methodology (2009)

COMMITTEE Horacio Arló-Costa (advisor) · Teddy Seidenfeld (advisor)

University of Wisconsin-Madison

B.A. Mathematics (2005)

B.A. Philosophy (2005)

ACADEMIC POSITIONS

The City College of New York (CUNY)

Department of Computer Science

Assistant Professor, Adjunct

Spring 2020 - PRESENT

Brooklyn College (CUNY)

Department of Computer & Information Science

Assistant Professor, Adjunct

Fall 2019 - Spring 2020

The Graduate Center (CUNY)

Department of Computer Science

Research Scientist, Graduate Center Foundation Fellowship

Fall 2019 - Spring 2020

Ludwig-Maximilians-Universität München

Munich Center for Mathematical Philosophy

External Faculty Research Scientist

Jan 2012 - PRESENT

Visiting Research Scientist

Aug 2015 - Dec 2017

Universität Regensburg

Department of Theoretical Philosophy

Research Scientist

Aug 2015 - Dec 2017

Max Planck Institute for Human Development

Center for Adaptive Rationality

Research Scientist, Adjunct

Aug 2015 - Dec 2017

Postdoctoral Research Fellow

Jan 2013 - Jul 2015

Principal Investigator

PROJECT **Close Encounters of the Wicked Kind**

INVESTIGATORS Shirshendu Chatterjee (CUNY) · Akira Kawaguchi (CUNY)
Bud Mishra (COURANT) · Rohit Parikh (CUNY)

PUBLICATIONS

“Numerical Patterns in Cris Calude’s Work” (with J.D. Stecher, UNIV. OF ALBERTA). Forthcoming in C. Campeanu, M. Dinneen, and K. Svozil, editors, *Liber Amicorum for Cris Calude*.

“Pseudo-visibility: A Game Mechanic Involving Willful Ignorance” (with S.A. Alexander, U.S. SECURITIES AND EXCHANGE COMMISSION). In *Proceedings of the 35th International Florida Artificial Intelligence Research Society Conference (FLAIRS-35): 2022. Special Track: Artificial Intelligence in Games, Serious Games, and Multimedia*.

“Less Is More: Decision Making & Information Sharing under Severe Uncertainty” (with G. Lam, THE CITY UNIVERSITY OF NEW YORK). In *Proceedings of the 35th International Florida Artificial Intelligence Research Society Conference (FLAIRS-35): 2022. Special Track: Uncertain Reasoning*.

“Rigidity in Elicitation.” *Journal of the Royal Statistical Society, Series A, Discussion on the Meeting on “Testing by Betting: A Strategy for Statistical and Scientific Communication”* (G. Shafer 2020).

“Dilation and Asymmetric Relevance” (with Gregory Wheeler). In *Proceedings of Machine Learning Research (PMLR): 2019*.

“Qualitative Axioms of Uncertainty as a Foundation for Probability and Decision-Making” (edited and posthumously co-authored with Patrick Suppes). *Minds and Machines*, 26(2):185–202, 2016.

Finding Foundations for Bounded and Adaptive Rationality (co-edited and co-authored introduction with Ralph Hertwig). *Minds and Machines*, 26(1-2):2016.

“Dilation, Disintegrations, and Delayed Decisions” (with Gregory Wheeler). In T. Augustin, S. Doria, E. Miranda, and E. Quaeghebeur, editors, *Proceedings of the Ninth International Symposium on Imprecise Probability: Theories and Applications (ISIPTA): 227-236*, 2015.

“Demystifying Dilation” (with Gregory Wheeler). *Erkenntnis*, 79(6): 1305-1342, December 2014.

“Comparative Expectations.” *Studia Logica*, 102(4): 811-848, August 2014.

“When is an Example a Counterexample?” (with Eric Pacuit and Jan-Willem Romeijn). In B.C. Schipper, editor, *Proceedings of the Fourteenth Conference on Theoretical Aspects of Rationality and Knowledge (TARK)*, 156-165, 2013.

“What Language Dependence Problem? A Reply for Joyce to Fitelson on Joyce” (with Clark Glymour). *Philosophy of Science*, 79(4): 561-574, October 2012.

“Fast and Frugal Heuristics: Rationality and the Limits of Naturalism” (with Horacio Arló-Costa). *Synthese*: 1-20, November 2012.

PUBLICATIONS
(CONT'D)

"Belief and Probability: A General Theory of Probability Cores" (with Horacio Arló-Costa). *International Journal of Approximate Reasoning*, 53(3): 293-315, April 2012.

"Belief Revision" (with Horacio Arló-Costa). In L. Horsten and R. Pettigrew, editors, *Continuum Companion to Philosophical Logic*. Continuum Press, 2011.

"Bounded Rationality: Models for Some Fast and Frugal Heuristics" (with Horacio Arló-Costa). In A. Gupta, J.F.A.K. van Benthem, and E. Pacuit, editors, *Games, Norms and Reasons: Logic at the Crossroads*. Springer, 2011. A tribute to Rohit Parikh on the occasion of his 70th birthday.

"Social Norms, Rational Choice and Belief Change" (with Horacio Arló-Costa). In E.J. Olsson and S. Enqvist, editors, *Belief Revision meets Philosophy of Science*, Vol. 21 of *Logic, Epistemology, and the Unity of Science*. Springer, 2010.

"A Proof of Completeness for Continuous First-Order Logic" (with Itai Ben Yaacov). *Journal of Symbolic Logic*, 75(1): 168-190, March 2010.

PREPRINTS

"Just Can't Get Enough? Choose Just Enough Foundations of Probability" (with S.A. Alexander, U.S. SECURITIES AND EXCHANGE COMMISSION). (2022).

"Adversarial Attacks in Cooperative AI" (with T. Fujimoto, PACIFIC NORTHWEST NATIONAL LABORATORY). (2022).

"Representation and Invariance in Reinforcement Learning" (with S.A. Alexander, U.S. SECURITIES AND EXCHANGE COMMISSION). [Preprint arXiv:2112.07752](https://arxiv.org/abs/2112.07752) (2021).

"Set-Valued Bayesian Consensus" (2021)

"Strategic Transparency in Economies of Information Exchange" (with E. Pacuit, UNIV. OF MARYLAND; and G. Lam, THE CITY COLLEGE OF NEW YORK)

"Trivialities and Possibilities of Normative Accounting Standards" (with J. Stecher, UNIV. OF ALBERTA).

PRESENTATIONS

"Measurement Theory sans Archimedes or Order, with Applications to Logic, Probability, and Choice" (with S.A. Alexander, U.S. SECURITIES AND EXCHANGE COMMISSION; L.S. Moss, INDIANA UNIV.; J.D. Stecher, UNIV. OF ALBERTA). (July 2022). *The 55th Annual Meeting of the Society for Mathematical Psychology* (MATHPSYCH), Toronto.

"Money can't buy me love." (June 2021). *The 20th Annual Conference of the Society for the Advancement of Economic Theory* (SAET): Current Trends in Economics, Seoul.

"The Hahn-Hölder." (May 2021). *The Nineteenth Annual Workshop on Combinatorial and Additive Number Theory* (CANT), New York City.

"Money can't buy me love." (April 2021). *Indiana University Logic Seminar*, Department of Mathematics, Indiana University.

PRESENTATIONS

(CONT'D)

"Rigidity in Elicitation." *Royal Statistical Society Discussion Meeting: Glenn Shafer's "Testing by Betting: A Strategy for Statistical and Scientific Communication," Royal Statistical Society International Conference 2020.*

"Bayesian Aggregation under Severe Uncertainty and Unresolved Conflict." (October 2019). *Seminar in Logic, Games and Language, Department of Computer Science, CUNY Graduate Center.*

"From Hölder to Hahn: Comparative, Classificatory, and Quantitative Conceptions in Probability and Decision." (April 2019). *Logic, Probability, and Games, University Seminars, Columbia University.*

"Invited Discussion Panel." (April 2016). *Second Munich Graduate Workshop in Mathematical Philosophy: Formal Epistemology, Munich Center for Mathematical Philosophy.*

"Dilation and the Value of Information" (with Gregory Wheeler). (March 2016). *Fifth Annual Meeting of New Frameworks of Rationality, Schloss Etelsen.*

"Conditionals and Conditional Reasoning: Qualitative Perspectives" (with Hans Rott). (March 2016). *Fifth Annual Meeting of New Frameworks of Rationality, Schloss Etelsen.*

"Invited Tutorial Session." (March 2016). *MuST 9: Evidence, Inference, and Risk, Munich Center for Mathematical Philosophy.*

"Full Belief and Partial Belief under Conditions of Severe Uncertainty" (March 2016). *Invited Symposium: Full Belief and Partial Belief. The 113th Annual Meeting of the Central Division of the American Philosophical Association (APA), Chicago.*

"Comparative, Classificatory, and Quantitative Conceptions of Probability, Independence, and Entropy." (16 February 2016). *Workshop on Entropy, Ludwigsburg University.*

"Admissible Decisions, Permissive Previsions" (5 November 2015). *Colloquium in Mathematical Philosophy, Munich Center for Mathematical Philosophy.*

"Strictly Coherent Choice under Uncertainty." (3 September 2015). *The Eighth Workshop on Principles and Methods of Statistical Inference with Interval Probability (WPMSIIP), Department of Statistics, Ludwig-Maximilians-Universität München.*

"Predictable Doubts" (with Gregory Wheeler). (1 September 2015). *The Eighth Workshop on Principles and Methods of Statistical Inference with Interval Probability (WPMSIIP), Department of Statistics, Ludwig-Maximilians-Universität München.*

"Dilation, Disintegrations, and Delayed Decisions" (with Gregory Wheeler). (July 2015). *The Ninth Biennial International Symposium on Imprecise Probability: Theories and Applications (ISIPTA), Pescara.*

"Slightly More Radical Personal Probability." (8 July 2015). *Bristol-Groningen Conference in Formal Epistemology, University of Bristol.*

PRESENTATIONS
(CONT'D)

"Slightly More Radical Personal Probability." (13 June 2015). *Workshop on Probability and Belief*, University of Regensburg.

"Comparative Expectations" (2 June 2015). *Research Colloquium*, Düsseldorf Center for Logic and Philosophy of Science, Heinrich Heine University Düsseldorf.

"Dilation, Disintegrations, Dominance Principles, and Delayed Decisions." (6 February 2015). *Workshop on Information, Search, and Causes: Rational and Cognitive Approaches*, Center for Logic, Language, and Cognition, University of Turin.

"Demystifying Dilation" (with Gregory Wheeler). (27 June 2014). *Workshop on Imprecise Probabilities in Statistics and Philosophy*, Munich Center for Mathematical Philosophy.

"Numerical Representations of Ordered Vector Spaces." (6 June 2014). *Seminar on Model Theory*, Department of Mathematics and Statistics, University of Konstanz.

"Dogmas, Dominance, and Disintegrations." (30 April 2014). *Formal Epistemology Symposium: Justification and Probabilistic Support*, Faculty of Philosophy, University of Groningen. "Great Expectations: Strictly Coherent Preferences, No Holds Barred." (16 October 2013). *Research Colloquium*, Adaptive Behavior and Cognition, Max Planck Institute for Human Development.

"Prospects for a Theory of Non-Archimedean Expected Utility: Impossibilities and Possibilities." (18 September 2013). *The Sixth Workshop on Combining Probability and Logic (PROGIC)*, Munich Center for Mathematical Philosophy.

"An Extension Theorem and a Numerical Representation Theorem for Qualitative Comparative Expectations without an Archimedean Axiom, without Measurability or Closure Conditions, and without help from Ultraproducts." (6 August 2013). *The 46th Annual Meeting of the Society for Mathematical Psychology (MATHPSYCH)*, University of Potsdam.

"A Very Brief Introduction to Non-Monotonic Logic: Formal and Philosophical Issues." (1 August 2013). *Workshop on Descriptive and Normative Theories of Conditionals*, Adaptive Behavior and Cognition, Max Planck Institute for Human Development.

"Strictly Coherent Preferences, No Holds Barred." (25 July 2013). *The 13th Annual Conference of the Society for the Advancement of Economic Theory (SAET): Current Trends in Economics*, Mines ParisTech.

"Bigger is Not Always Better When Nothing is Good Enough." (18 July 2013). *Colloquium in Mathematical Philosophy*, Munich Center for Mathematical Philosophy.

"When is an Example a Counterexample?" (with Eric Pacuit and Jan-Willem Romeijn). (7 January 2013; delivered by Hans van Ditmarsch on our behalf). *The 14th Conference on Theoretical Aspects of Rationality and Knowledge (TARK)*, Institute of Mathematical Sciences.

"Conditional Probability, Conditionals, Belief, And Decision: The Theory of Probability Cores." (3 August 2012). *Logic Workshop in Buenos Aires*, Sociedad Argentina De Análisis Filosófico.

PRESENTATIONS

(CONT'D)

"Individual and Collective Deliberation in Decision Making" (with Eric Pacuit). (5 June 2012). *Workshop on Consensus*, Ecole Normale Supérieure.

"The Theory of Probability Cores in Bayesian Epistemology and Decision Theory." (2 June 2012). *The Ninth Annual Formal Epistemology Workshop (FEW)*, Munich Center for Mathematical Philosophy.

"Matryoshka Epistemology: The Role of Cores in Belief and Decision." (19 November 2011). *Commemorative Colloquium for Horacio Arló-Costa*, Carnegie Mellon University.

"Matryoshka Epistemology: The Role of Cores in Belief and Decision." (10 September 2011). *The Fifth Workshop on Combining Probability and Logic (PROGIC)*, Columbia University.

"Filling in the Foundations of Probability." (9 September 2011). *Seminar on Logic and Games*, CUNY Graduate Center.

"Dutch Books for Primitive Conditional Probability and Lexicographic Decision-Making, or Probabilism with Tiers: Where to Find Support when You Want It." (26 June 2011). *The Eighth Annual Episteme Conference*, Carnegie Mellon University.

"Fast and Frugal Heuristics in Perspective: Take the Best and the Priority Heuristic in Perspective" (with Horacio Arló-Costa). (1 December 2010). *Workshop on Experience, Heuristics, and Choice: Prospects for Bounded Rationality*, Carnegie Mellon University.

"Indicative Conditionals, Obligation and Decision Theoretic Conditionals" (with Horacio Arló-Costa). (4 September 2010). *The Seventh Annual Formal Epistemology Workshop (FEW)*, University of Konstanz.

"Fast and Frugal Heuristics: Take the Best and the Priority Heuristic in Perspective" (with Horacio Arló-Costa). (15 April 2010). *Synthese Conference on Epistemology and Economics*, Columbia University.

"Comments on Sarah Moss's 'Updating as Communication.'" (19 June 2009). *The Sixth Annual Formal Epistemology Workshop (FEW)*, Carnegie Mellon University.

"Comments on Paul Weirich's 'Calibration.'" (20 February 2009). *The 106th Annual Meeting of the Central Division of the American Philosophical Association (APA)*, Chicago.

"Completeness for Continuous First-Order Logic." (10 April 2007). *Mathematical Logic Seminar*, Department of Mathematical Sciences, Carnegie Mellon University.

"Completeness for Continuous First-Order Logic." (2 March 2006). *Southern Wisconsin Logic Colloquium (SWLC)*, Department of Mathematics, University of Wisconsin-Madison.

Minds and Machines

Journal Referee

The Journal of Symbolic Logic · *Theory and Decision* · *Journal of Economic Methodology* · *Mind*
International Journal of Approximate Reasoning · *Mathematical Logic Quarterly* · *Synthese*
The Review of Symbolic Logic · *The British Journal for the Philosophy of Science* · *Erkenntnis*
Journal of Philosophical Logic · *Studia Logica* · *Philosophy of Science* · *The Journal of Philosophy*
Minds and Machines · *Philosophical Quarterly* – multiple times for most journals –

Conference Referee

International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Granada (2021)
International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Ghent (2019)
International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Pescara (2015)
Theoretical Aspects of Rationality and Knowledge (TARK) in Pittsburgh (2015)
Conference on Causal and Probabilistic Reasoning (CPR) in Munich (2015)
Meeting of the Central States Philosophical Association (CSPA) in Evanston (2014)
Conference on Logic and the Foundations of Game and Decision Theory (LOFT) in Bergen (2014)
Finding Foundations for Bounded and Adaptive Rationality in Berlin (2013)
Workshop on Logic, Language, Information and Computation (WoLLIC) in Buenos Aires (2012)
Games, Interactive Rationality and Learning (GIRL) in Lund (2012)
Meeting of Society for Exact Philosophy (SEP) in Winnipeg (2011)
Meeting of the Canadian Philosophical Association (CPA) in Montreal (2010)

Program Committee Member

International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Granada (2021)
International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Ghent (2019)
International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Lugano (2017)
Munich Graduate Workshop in Mathematical Philosophy: Formal Epistemology in Munich (2016)
Conference on Logic and the Foundations of Game and Decision Theory (LOFT) in Maastricht (2016)
Conference on Causal and Probabilistic Reasoning (CPR) in Munich (2015)
International Symposium on Imprecise Probability:Theories and Applications (ISIPTA) in Pescara (2015)
Conference on Logic and the Foundations of Game and Decision Theory (LOFT) in Bergen (2014)
Finding Foundations for Bounded and Adaptive Rationality in Berlin (2013)
SIPTA Workshop on Uncertainty at Columbia University (2010)

Conference & Program Chair

Conceptions of Belief in Philosophy and Science in Regensburg (2016)
Finding Foundations for Bounded and Adaptive Rationality in Berlin (2013)

PROFESSIONAL
ACTIVITIES
(CONT'D)

Presiding Administrator

Choice & Inference

2011 – 2017

Professional Societies

American Mathematical Society

AMS

Society for Imprecise Probability: Theories and Applications

SIPTA

Society for the Advancement of Economic Theory

SAET

Society for Mathematical Psychology

SMP

Industry Credential

Cybersecurity — Faculty Instructor, Advanced IBM Certification

2022

ACADEMIC
SERVICE

Student Research Supervisor

The City College of New York (CUNY)

Grove School of Engineering

Grove Data Science Scholars Program

Spring 2022 – PRESENT

Consortium Research Supervisor

The City College of New York (CUNY)

Grove School of Engineering

US Intelligence Community Center for Academic Excellence (ICCAE) Spring 2021 – PRESENT

Student Research Supervisor

The City College of New York (CUNY)

Grove School of Engineering

NSF Research Experiences for Undergraduates Program

Summer · Fall 2021

Consortium Research & Curriculum Committee

The City College of New York (CUNY)

Grove School of Engineering

US Intelligence Community Center for Academic Excellence (ICCAE) Fall 2021 – PRESENT

Faculty Selection Interviewer

Center for Adaptive Rationality

Max Planck Institute for Human Development

ARC Faculty Search Committee

February 2014 – August 2015

ACADEMIC
SERVICE
(CONT'D)

Applicant Selection Committee

Center for Adaptive Rationality

Max Planck Institute for Human Development

Annual Summer Institute on Bounded Rationality

April 2013 – April 2015

Graduate Admissions Committee

Dietrich College of Humanities & Social Sciences

Carnegie Mellon University

Department of Philosophy

January 2009 – February 2009

TEACHING

Instructor

The City College of New York (CUNY)

Department of Computer Science

Upper Division – Research

SENIOR PROJECT I

Spring 2020

SENIOR PROJECT II

Fall 2020

Upper Division – Advanced

COMPUTABILITY

Spring 2022

MATHEMATICAL OPTIMIZATION TECHNIQUES

Spring 2021 ♦ Fall 2021

COMPUTATIONAL COMPLEXITY

Fall 2021

Upper Division – Intermediate

THEORETICAL COMPUTER SCIENCE

Spring · Summer · Fall 2021 ♦ Spring 2022

♦ Spring · Fall 2020

Lower Division – Intermediate

DISCRETE STRUCTURES

Summer 2021 ♦ Spring 2022

Brooklyn College (CUNY)

Department of Computer & Information Science

Upper Division – Intermediate

ANALYSIS OF ALGORITHMS

Spring 2020

Lower Division – Intermediate

DISCRETE STRUCTURES

Fall 2019

TEACHING
(CONT'D)

Ludwig-Maximilians-Universität München

Munich Center for Mathematical Philosophy

Graduate & Undergraduate Hybrid

MODELS OF BELIEF AND DECISION (with G. Wheeler)

Spring 2016

Carnegie Mellon University

Department of Philosophy

Lower Division – Intermediate

INTRODUCTION TO PHILOSOPHY

Spring · Summer 2010 ♦ Spring 2011

♦ Summer 2009

ARGUMENTS AND LOGICAL ANALYSIS

Summer 2007

Messmer High School

Department of Mathematics

HONORS PRECALCULUS

Spring 2018

ALGEBRA

Spring 2018

Guest Lecturer

Carnegie Mellon University

Department of Philosophy

LOGIC AND ARTIFICIAL INTELLIGENCE (E. Pacuit)

Fall 2011

MODAL LOGIC (H. Arló-Costa)

Spring 2010 ♦ Spring 2011

Teaching Assistant

Carnegie Mellon University

Center for Formal Epistemology

PHILOSOPHICAL LOGIC AND FORMAL EPISTEMOLOGY (H. Arló-Costa)

Summer 2010

Carnegie Mellon University

Department of Philosophy

INTRODUCTION TO PHILOSOPHY (J. Mumma, M. Harrell)

Fall 2006 ♦ Fall 2007

University of Wisconsin-Madison

Division of Diversity, Equity & Educational Achievement

PEOPLE PROGRAM

Summer 2002

Instructor/Tutor

University of Wisconsin-Madison

Center for Educational Opportunity

TRIO PROGRAM

August 2002 – December 2005

HONORS
& AWARDS

US Intelligence Community Center for Academic Excellence (ICCAE) Grant, awarded by Syracuse University's ICCAE Small Research Grant Selection Committee, 2020 – 2021

SCHWERPUNKTPROGRAM 1516 Grant, awarded by German Research Foundation (DFG), 2015 – 2017

Vielbirth Project Grant, awarded by Hans Vielbirth Foundation, for international scientific conference, 2016

Max Planck Postdoctoral Research Fellowship, awarded by Max Planck Society, 2013 – 2015

Chancellor's Fellowship for Graduate Study, awarded by the Graduate Dean of the University of California, Berkeley, to pursue a doctoral degree in the Group in Logic and the Methodology of Science, 2008 – 2011 (award declined)

Graduate Research Fellowship, courtesy of T. Seidenfeld, for summer research, 2009 – 2012

Nuffic HSP Huygens Scholarship, awarded by the Dutch Ministry of Education, Culture and Science, to study at the Institute for Logic, Language and Computation (ILLC) of the Universiteit van Amsterdam, 2006 – 2008 (award declined)

NSF VIGRE grant to conduct research on continuous first-order logic, 2005 – 2006

Notre Dame Department of Mathematics Scholarship to participate in proof theory course at the University of Notre Dame, Summer 2005

Phi Beta Kappa academic honor society

Dean's Honor List