Asta Halkjær From

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I am a software developer with great attention to detail and a love for finding abstractions that lead to beautiful, correct designs. I enjoy digging into new technologies and coming up with pedagogical explanations for talks and technical writing. I greatly enjoy sharing my knowledge and have done so both at conferences and as a teaching assistant during my studies. During my PhD in computer science and logic, I have modernized old proofs and techniques using the latest developments in interactive proof assistants. I have co-designed proof automation algorithms for the Lean 4 theorem prover in a successful international effort and developed an abstract framework for logical completeness proofs in Isabelle/HOL.

Education

PhD in Computer Science and Logic[1] 1 February 2020 – 31 January 2023
Technical University of Denmark (DTU Compute). (defense: April 21)
Formally Correct Deduction Methods for Computational Logic. Advisors: Jørgen Villadsen, Nina Gierasimczuk.

MSc in Computer Science and Engineering (Honours Programme) 2018–2020
Technical University of Denmark (DTU Compute), incl. 30 ECTS at TU Wien, Austria.
Study line: *Artificial Intelligence and Algorithms.* GPA 12.
Thesis: *Hybrid Logic.* Advisors: Jørgen Villadsen, Alexander Birch Jensen, Patrick Blackburn.

Work

Software Developer *Dalux*, Copenhagen. C#, TypeScript, Angular, Cypress. from Aug 2023
Research Assistant *Technical University of Denmark*. Programming. 21 hours/week. Aug–Dec 2017
Teacher *Hello World*, Copenhagen. MIT Scratch programming workshops for ages 9–12. May–Jul 2017

Skills

Languages Fluent in written and spoken English and Danish.
Sample Courses 02157 + 02257 (Applied) Functional Programming, 02158 Parallel Programming, 02282 Algorithms for Massive Data Sets, 02285 Artificial Intelligence and Multi-Agent Systems, 02263 Formal Aspects of Software Engineering, Formal Methods for Security and Privacy (TU Wien).

Awards & Grants

DTU Young Researcher Award *Given every year to six young researchers who have made an extraordinary effort and who have great potential for further development* (DKK 15,000).
Distinguished Paper Award For my CPP 2023 paper with Jannis Limperg on Lean 4 automation.
Otto Mønsted Fonden Travel Grant To participate at FLoC 2022 in Haifa, Israel (DKK 7,500).
DTU Travel Grant Awarded to me personally by DTU's Executive Board, February 2022, in recognition of my academic qualities and merits (DKK 25,000).
2nd team of 26 02285 Artificial Intelligence and Multi-Agent Systems (2018) internal competition.
Fellow Winner 02210 Algorithms and Data Structures 2 (2015) internal programming competition.

Teaching Assistant at DTU Compute

02287	Logical Theories for Uncertainty and Learning	2020
02102	Introductory Programming (Java & C)	2020
02256	Automated Reasoning	2020
02156	Logical Systems and Logic Programming	2018 & 2019
02180	Introduction to Artificial Intelligence	2018
02110	Algorithms and Data Structures 2	2016

02105 Algorithms and Data Structures 1 2016 & 2017
02101 Introductory Programming (Java) 2015 & 2016

Academic Activities

Program Committee DaLí 2023: Dynamic Logic — New trends and applications.

Co-chair Logic and Computation track of the Student Session @ 32nd European Summer School in Logic, Language and Information (ESSLLI 2021).

Reviewing Journal of Logic and Computation (DaLí 2020 special issue). *Subreviewing:* Theoretical Aspects of Rationality & Knowledge (TARK 2023), Conference on Intelligent Computer Mathematics (CICM 2022), Conference on Logic, Rationality and Interaction (LORI-VIII 2021), Dynamic Logic: New Trends and Applications (DaLí 2020).

Participant Satisfiability (SAT), Satisfiability Modulo Theories (SMT), and Automated Reasoning (AR) Summer School 2019, Lisbon, Portugal. Invited by speaker Laura Kovács (TU Wien).

Research Visits

VU Amsterdam *Lean Forward*: Proof automation for the Lean theorem prover. May 2022
VU Amsterdam *Lean Forward*: Proof automation for the Lean theorem prover. November 2022
VU Amsterdam (remote) Virtual research stay hosted by Jasmin Blanchette. May & June 2021.

Invited Talks

A Naive Prover for First-Order Logic at the Languages, Systems, and Data Seminar (LSD spring 2022). Invited by Lindsey Kuper (UC Santa Cruz), virtual.

My PhD Journey at kick-off event for new PhD students, fall 2021. Invited by Kim Knudsen, Head of PhD School, DTU Compute. Comwell Hotel, Holte.

External Talks

A Cute Trick for Calculating Saturated Sets at Copenhagen Logic Gathering 2023, Copenhagen.

Verifying a Sequent Calculus Prover for First-Order Logic with Functions in Isabelle/HOL at Thirteenth Conference on Interactive Theorem Proving (ITP 2022), Haifa, Israel.

On Termination for Hybrid Tableaux at the Isabelle Workshop 2022, Haifa, Israel.

Formalized Soundness and Completeness of Epistemic Logic at 27th Workshop on Logic, Language, Information and Computation (WoLLIC 2021), virtual.

Formalizing Axiomatic Systems for Propositional Logic in Isabelle/HOL at 14th Conference on Intelligent Computer Mathematics (CICM 2021), virtual.

Formalized Soundness and Completeness of Epistemic Logic at International Workshop on Logical Aspects in Multi-Agent Systems and Strategic Reasoning (LAMAS & SR 2021), virtual.

Hybrid Logic in the Isabelle Proof Assistant: Benefits, Challenges and the Road Ahead at Advances in Modal Logic (AiML 2020), virtual.

Formally Correct Deduction Methods for Computational Logic at 13th Conference on Intelligent Computer Mathematics (CICM 2020) doctoral session, virtual.

Formalizing Henkin-Style Completeness of an Axiomatic System for Propositional Logic at WeSSLLI + ESSLLI Virtual Student Session 2020, virtual.

Formalizing a Seligman-Style Tableau System for Hybrid Logic at International Joint Conference on Automated Reasoning (IJCAR 2020), virtual.

A Concise Sequent Calculus for Teaching First-Order Logic at the Isabelle Workshop 2020, virtual.

Using the Isabelle Proof Assistant: Seligman-Style Tableau for Hybrid Logic at The LogicS of Prior Past, Present, and Future 2019, Roskilde University, Denmark.

[1] Google Scholar h-index: 9, ORCID: 0000-0002-3601-0804 (48 works), dblp.org/pid/214/1791 (30 records).

Formalized Soundness and Completeness of Natural Deduction for First-Order Logic at Scandinavian Logic Symposium 2018, University of Gothenburg, Sweden.

Local Talks

Generic Epistemic and Public Announcement Logic Completeness Results at Logic & AI @ AlgoLoG seminar, september 2022, DTU Compute, Kongens Lyngby.

Verifying a Sequent Calculus Prover for First-Order Logic with Functions in Isabelle/HOL at PhD Bazaar 2022, DTU Compute, Kongens Lyngby.

A Naive Prover for First-Order Logic as guest talk in the DTU course 02256 Automated Reasoning, DTU Compute, Kongens Lyngby.

Hybrid Logic at 3rd World Logic Day 2021, A Zoom on Logic, organized by DTU Compute, virtual.

Belief Revision and Isabelle/HOL at a seminar course 2020, DTU Compute, Kongens Lyngby.

The Isabelle Proof Assistant and Hybrid Logic: Formalizing Seligman-Style Tableaux at an AlgoLoG section seminar 2019, DTU Compute, Kongens Lyngby.

Formalized Soundness and Completeness of Natural Deduction for First-Order Logic at Local Isabelle Workshop 2018, DTU Compute, Kongens Lyngby.

Magnolia — Implementing System F with Anonymous Sums and Products at Workshop on Programs & Proofs 2018, DTU Compute, Kongens Lyngby.

FIT — From's Isabelle Tutorial — Verification of Quicksort at Proof Assistants and Related Tools 2017, DTU Compute, Kongens Lyngby.

Co-Supervision at DTU Compute

MSc thesis	Frederik Krogsdal Jacobsen, *Formalization of Logical Systems in Isabelle.*	2021
BSc thesis	Emmanuel André Ryom, *A Proof Tool for First-Order Logic.*	2021
BSc thesis	Simon Tobias Lund, *Prover Programming.*	2021
Special Course	*A Case Study in Computer-Assisted Meta-Reasoning.*	2021
Special Course	*Advanced Automated Reasoning.*	2021
Special Course	*Sequent Calculus Verifier.*	2021
Special Course	*Advanced Topics in Types and Programming Languages.*	2021
Special Course	*Advanced Theorem Proving in Isabelle.*	2020
Special Course	*Type Theory and Formal Proof.*	2020
Special Course	*Correctness proofs for distributed systems in Isabelle.*	2020
Special Course	*Fundamental Concepts in Algebraic Topology.*	2020
Special Course	*Visualization of proofs.*	2020

Entries in the Isabelle Archive of Formal Proofs

Synthetic Completeness	2023
Soundness and Completeness of Implicational Logic (with J. Villadsen)	2022
A Naive Prover for First-Order Logic	2022
A Sequent Calculus Prover for First-Order Logic with Functions (with F. K. Jacobsen)	2022
Soundness and Completeness of an Axiomatic System for First-Order Logic	2021
Public Announcement Logic	2021
Formalizing a Seligman-Style Tableau System for Hybrid Logic	2019
A Sequent Calculus for First-Order Logic	2019
Epistemic Logic: Completeness of Modal Logics	2018

Papers Under Submission

A. H. From and F. K. Jacobsen. "Verifying a Sequent Calculus Prover for First-Order Logic with Functions in Isabelle/HOL". In: *Journal of Automated Reasoning* (2023). Under submission.

A. H. From. "Formalized Soundness and Completeness of Epistemic and Public Announcement Logic". In: *Journal of Logic and Computation — Special Issue from the 27th Workshop on Logic, Language, Information and Computation (WoLLIC 2021)* (2022). Accepted for publication.

A. H. From. "Formalizing Henkin-Style Completeness of an Axiomatic System for Propositional Logic". In: *Web Summer School in Logic, Language, and Information - ESSLLI 2020 Student Session, Brandeis University, USA, July 11-17, 2020, Selected Papers 2019-2020*. Ed. by A. Pavlova and M. Y. Pedersen. Lecture Notes in Computer Science. Accepted for publication. Springer, 2020.

Publications

A. M. Eschen, A. H. From, and J. Villadsen. "More Formalized Axiomatic Systems for Propositional Logic in Isabelle/HOL". In: *Logic and Artificial Intelligence*. Ed. by S. Cojocaru et al. Chisinau: Vladimir Andrunachievici Institute of Mathematics and Computer Science, 2023, pp. 7–22. ISBN: 978-9975-68-484-2. URL: https://slai2022.islai.org/proceedings/.

A. H. From, A. Schlichtkrull, and J. Villadsen. "A sequent calculus for first-order logic formalized in Isabelle/HOL". In: *Journal of Logic and Computation* 33.4 (2023), pp. 818–836. DOI: 10.1093/logcom/exad013.

A. H. From and J. Villadsen. "A Naive Prover for First-Order Logic: A Minimal Example of Analytic Completeness". In: *Automated Reasoning with Analytic Tableaux and Related Methods - 32nd International Conference, TABLEAUX 2023, Prague, Czech Republic, September 18-21, 2023, Proceedings*. Ed. by R. Ramanayake and J. Urban. Vol. 14278. Lecture Notes in Computer Science. Springer, 2023, pp. 468–480. DOI: 10.1007/978-3-031-43513-3_25.

J. Limperg and A. H. From. "Aesop: White-Box Best-First Proof Search for Lean". In: *Proceedings of the 12th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2023, Boston, MA, USA, January 16-17, 2023*. Ed. by R. Krebbers et al. ACM, 2023, pp. 253–266. DOI: 10.1145/3573105.3575671.

A. H. From and F. K. Jacobsen. "Verifying a Sequent Calculus Prover for First-Order Logic with Functions in Isabelle/HOL". In: *13th International Conference on Interactive Theorem Proving, ITP 2022, August 7-10, 2022, Haifa, Israel*. Ed. by J. Andronick and L. de Moura. Vol. 237. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022, 13:1–13:22. DOI: 10.4230/LIPIcs.ITP.2022.13.

A. H. From, S. T. Lund, and J. Villadsen. "A Case Study in Computer-Assisted Meta-reasoning". In: *Distributed Computing and Artificial Intelligence, Volume 2: Special Sessions 18th International Conference*. Ed. by S. R. González et al. Vol. 332. Lecture Notes in Networks and Systems. Cham: Springer International Publishing, 2022, pp. 53–63. ISBN: 978-3-030-86887-1. DOI: 10.1007/978-3-030-86887-1_5.

J. Villadsen et al. "Interactive Theorem Proving for Logic and Information". In: *Natural Language Processing in Artificial Intelligence — NLPinAI 2021*. Ed. by R. Loukanova. Vol. 999. Studies in Computational Intelligence. Cham: Springer International Publishing, 2022, pp. 25–48. ISBN: 978-3-030-90138-7. DOI: 10.1007/978-3-030-90138-7_2.

A. H. From. "A Succinct Formalization of the Completeness of First-Order Logic". In: *27th International Conference on Types for Proofs and Programs, TYPES 2021, June 14-18, 2021, Leiden, The Netherlands (Virtual Conference)*. Ed. by H. Basold, J. Cockx, and S. Ghilezan. Vol. 239. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021, 8:1–8:24. DOI: 10.4230/LIPIcs.TYPES.2021.8.

A. H. From. "Formalized Soundness and Completeness of Epistemic Logic". In: *Logic, Language, Information, and Computation - 27th International Workshop, WoLLIC 2021, Virtual Event, October 5-8, 2021, Proceedings*. Ed. by A. Silva, R. Wassermann, and R. J. G. B. de Queiroz. Vol. 13038. Lecture Notes in Computer Science. Springer, 2021, pp. 1–15. DOI: 10.1007/978-3-030-88853-4_1.

A. H. From, A. M. Eschen, and J. Villadsen. "Formalizing Axiomatic Systems for Propositional Logic in Isabelle/HOL". In: *Intelligent Computer Mathematics - 14th International Conference, CICM 2021, Timisoara, Romania, July 26-31, 2021, Proceedings*. Ed. by F. Kamareddine and C. S. Coen. Vol. 12833. Lecture Notes in Computer Science. Springer, 2021, pp. 32–46. DOI: 10.1007/978-3-030-81097-9_3.

A. H. From, F. K. Jacobsen, and J. Villadsen. "SeCaV: A Sequent Calculus Verifier in Isabelle/HOL". In: *Proceedings 16th Logical and Semantic Frameworks with Applications, LSFA 2021, Buenos Aires, Argentina (Online), 23rd - 24th July, 2021*. Ed. by M. Ayala-Rincón and E. Bonelli. Vol. 357. EPTCS. Open Publishing Association, 2021, pp. 38–55. DOI: 10.4204/EPTCS.357.4.

A. H. From, A. Schlichtkrull, and J. Villadsen. "A Sequent Calculus for First-Order Logic Formalized in Isabelle/HOL". In: *Proceedings of the 36th Italian Conference on Computational Logic, Parma, Italy, September 7-9, 2021*. Ed. by S. Monica and F. Bergenti. Vol. 3002. CEUR Workshop Proceedings. CEUR-WS.org, 2021, pp. 107–121. URL: http://ceur-ws.org/Vol-3002/paper7.pdf.

J. Villadsen, A. H. From, and P. Blackburn. "Teaching Intuitionistic and Classical Propositional Logic Using Isabelle". In: *Proceedings 10th International Workshop on Theorem Proving Components for Educational Software, ThEdu@CADE 2021, (Remote) Carnegie Mellon University, Pittsburgh, PA, United States, 11 July 2021*. Ed. by J. Marcos, W. Neuper, and P. Quaresma. Vol. 354. EPTCS. Open Publishing Association, 2021, pp. 71–85. DOI: 10.4204/EPTCS.354.6.

A. H. From. "Hybrid logic in the Isabelle Proof Assistant: Benefits, Challenges and the Road Ahead". In: *Short Papers: Advances in Modal Logic (AiML)*. Ed. by N. Olivetti and R. Verbrugge. 2020, pp. 23–27. URL: https://archive.org/details/aiml2020shortpapers.pdf.

A. H. From. "Synthetic Completeness for a Terminating Seligman-Style Tableau System". In: *26th International Conference on Types for Proofs and Programs, TYPES 2020, March 2-5, 2020, University of Turin, Italy*. Ed. by U. de'Liguoro, S. Berardi, and T. Altenkirch. Vol. 188. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020, 5:1–5:17. DOI: 10.4230/LIPIcs.TYPES.2020.5.

A. H. From, P. Blackburn, and J. Villadsen. "Formalizing a Seligman-Style Tableau System for Hybrid Logic (Short Paper)". In: *Automated Reasoning - 10th International Joint Conference, IJCAR 2020, Paris, France, July 1-4, 2020, Proceedings, Part I*. Ed. by N. Peltier and V. Sofronie-Stokkermans. Vol. 12166. Lecture Notes in Computer Science. Springer, 2020, pp. 474–481. DOI: 10.1007/978-3-030-51074-9_27.

A. H. From, J. Villadsen, and P. Blackburn. "Isabelle/HOL as a Meta-Language for Teaching Logic". In: *Proceedings 9th International Workshop on Theorem Proving Components for Educational Software, ThEdu@IJCAR 2020, Paris, France, 29th June 2020*. Ed. by P. Quaresma, W. Neuper, and J. Marcos. Vol. 328. EPTCS. Open Publishing Association, 2020, pp. 18–34. DOI: 10.4204/EPTCS.328.2.

A. H. From et al. "Teaching a Formalized Logical Calculus". In: *Proceedings 8th International Workshop on Theorem Proving Components for Educational Software, ThEdu@CADE 2019, Natal, Brazil, 25th August 2019*. Ed. by P. Quaresma, W. Neuper, and J. Marcos. Vol. 313. EPTCS. Open Publishing Association, 2019, pp. 73–92. DOI: 10.4204/EPTCS.313.5.

A. Schlichtkrull, J. Villadsen, and A. H. From. "Students' Proof Assistant (SPA)". In: *Proceedings 7th International Workshop on Theorem proving components for Educational software, ThEdu@FLoC 2018, Oxford, United Kingdom, 18 july 2018*. Ed. by P. Quaresma and W. Neuper. Vol. 290. EPTCS. Open Publishing Association, 2018, pp. 1–13. DOI: 10.4204/EPTCS.290.1.

J. Villadsen, A. H. From, and A. Schlichtkrull. "Natural Deduction Assistant (NaDeA)". In: *Proceedings 7th International Workshop on Theorem proving components for Educational software, ThEdu@FLoC 2018, Oxford, United Kingdom, 18 july 2018*. Ed. by P. Quaresma and W. Neuper. Vol. 290. EPTCS. Open Publishing Association, 2018, pp. 14–29. DOI: 10.4204/EPTCS.290.2.

J. Villadsen, A. Schlichtkrull, and A. H. From. "A Verified Simple Prover for First-Order Logic". In: *Proceedings of the 6th Workshop on Practical Aspects of Automated Reasoning co-located with Federated Logic Conference 2018 (FLoC 2018), Oxford, UK, July 19th, 2018*. Ed. by B. Konev, J. Urban, and P. Rümmer. Vol. 2162. CEUR Workshop Proceedings. CEUR-WS.org, 2018, pp. 88–104. URL: http://ceur-ws.org/Vol-2162/paper-08.pdf.

J. Villadsen et al. "Multi-Agent Programming Contest 2016 — The Python-DTU Team". In: *International Journal of Agent-Oriented Software Engineering* 6.1 (2018), pp. 86–100. DOI: 10.1504/IJAOSE.2018.10010604.

J. Villadsen et al. “Multi-Agent Programming Contest 2018 — The Jason-DTU Team”. In: *The Multi-Agent Programming Contest 2018 — Agents Teaming Up in an Urban Environment*. Ed. by T. Ahlbrecht, J. Dix, and N. Fiekas. Vol. 11957. Lecture Notes in Computer Science. Springer, 2018, pp. 41–71. DOI: 10.1007/978-3-030-37959-9_3.

J. Villadsen, A. H. From, and A. Schlichtkrull. “Natural Deduction and the Isabelle Proof Assistant”. In: *Proceedings 6th International Workshop on Theorem proving components for Educational software, ThEdu@CADE 2017, Gothenburg, Sweden, 6 Aug 2017*. Ed. by P. Quaresma and W. Neuper. Vol. 267. EPTCS. Open Publishing Association, 2017, pp. 140–155. DOI: 10.4204/EPTCS.267.9.

Other Articles

A. H. From. “On Termination for Hybrid Tableaux”. Isabelle Workshop 2022. 2022. URL: https://files.sketis.net/Isabelle_Workshop_2022/Isabelle_2022_paper_13.pdf.

A. H. From, A. B. Jensen, and J. Villadsen. “Formalized Soundness and Completeness of Epistemic Logic”. LAMAS & SR 2021, accepted abstract. 2021. URL: https://lamassr.github.io/editions/2021/papers/Formalized-Soundness.pdf.

A. H. From and J. Villadsen. “On the Use of Isabelle/HOL for Formalizing New Concise Axiomatic Systems for Classical Propositional Logic”. TYPES 2021, accepted abstract. 2021. URL: https://types21.liacs.nl/download/on-the-use-of-isabelle-hol-for-formalizing-new-concise-axiomatic-systems-for-classical-propositional-logic/.

A. H. From and J. Villadsen. “Teaching Automated Reasoning and Formally Verified Functional Programming in Agda and Isabelle/HOL”. 10th International Workshop on Trends in Functional Programming in Education (TFPIE 2021) — Presentation Only/Online Papers. 2021. URL: https://wiki.tfpie.science.ru.nl/images/a/a6/TFPIE_AHF_JV.pdf.

A. H. From and J. Villadsen. “A Concise Sequent Calculus for Teaching First-Order Logic”. Isabelle Workshop 2020. 2020. URL: https://files.sketis.net/Isabelle_Workshop_2020/Isabelle_2020_paper_6.pdf.

A. H. From. “Formalized soundness and completeness of natural deduction for first-order logic”. Scandinavian Logic Symposium 2018, accepted abstract. 2018. URL: https://scandinavianlogic.org/assets/attachments/book_of_abstracts_sls2018.pdf#page=11.

A. H. From, H. Hatteland, and J. Villadsen. “Teaching first-order logic with the natural deduction assistant (NaDeA)”. Scandinavian Logic Symposium 2018, accepted abstract. 2018. URL: https://scandinavianlogic.org/assets/attachments/book_of_abstracts_sls2018.pdf#page=11.

A. H. From, A. Schlichtkrull, and J. Villadsen. “Drawing Trees”. Isabelle Workshop 2018. 2018. URL: https://files.sketis.net/Isabelle_Workshop_2018/Isabelle_2018_paper_7.pdf.

A. H. From et al. “Substitutionless First-Order Logic: A Formal Soundness Proof”. Isabelle Workshop 2018. 2018. URL: https://files.sketis.net/Isabelle_Workshop_2018/Isabelle_2018_paper_3.pdf.

J. Villadsen, A. Schlichtkrull, and A. H. From. “Code Generation for a Simple First-Order Prover”. Isabelle Workshop 2016. 2016. URL: https://web.archive.org/web/20220121022845/https://www21.in.tum.de/~nipkow/Isabelle2016/Isabelle2016_12.pdf.