

Victor Lagerkvist, Ph.D.

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Employment History

November 2022 –	📌 Associate professor (universitetslektor) at TCSLAB, Linköping University, Sweden.
May 2020 – October 2022	📌 Assistant professor (biträdande universitetslektor) at TCSLAB, Linköping University, Sweden.
April 2018 – April 2020	📌 Postdoctoral researcher at TCSLAB, Linköping University, Sweden.
March 2016 – March 2018	📌 Postdoctoral researcher at the institute of algebra, Technische Universität Dresden, Germany.
November 2012 – Februari 2016	📌 PhD student at TCSLAB, Linköping University, Sweden.
Juli 2012 – October 2012	📌 Research assistant at TCSLAB, Linköping University, Sweden.

Academic Degrees

2020	📌 Habilitation (docent), Linköping University, Sweden.
2016	📌 PhD in Computer Science, Linköping University, Sweden. Thesis Title: <i>Strong Partial Clones and the Complexity of Constraint Satisfaction Problems: Limitations and Applications</i> . Advisor: Peter Jonsson.
2012	📌 M.Sc in Computer Science, Linköping University, Sweden. Thesis Title: <i>Restricted Constraint Satisfaction Problems and the Exponential-time Hypothesis</i> . Examiner: Peter Jonsson.
2010	📌 B.Sc in Computer Science, Linköping University, Sweden. Thesis Title: <i>A Comparison of SL- and Unit-resolution Search Rules for Stratified Logic Programs</i> . Examiner: Ulf Nilsson.
2006	📌 Gymnasieexamen, IT-gymnasiet, Uppsala.

Publications

Journal Articles

- 1 Couceiro, M., Haddad, L., & Lagerkvist, V. (2022). A survey on the fine-grained complexity of constraint satisfaction problems based on partial polymorphisms. *Journal of Multiple-Valued Logic and Soft Computing*, 38(1-2), 115–136.
- 2 Lagerkvist, V., & Roy, B. (2022). C-maximal strong partial clones and the inclusion structure of boolean weak bases. *Journal of Multiple Valued Logic and Soft Computing*, 38(3-4), 333–353.
- 3 Lagerkvist, V., & Wahlström, M. (2022). The (coarse) fine-grained structure of NP-hard SAT and CSP problems. *ACM Transactions on Computation Theory*, 14(1). [doi:10.1145/3492336](https://doi.org/10.1145/3492336)
- 4 Jonsson, P., Lagerkvist, V., & Osipov, G. (2021). Acyclic orders, partition schemes and CSPs: Unified hardness proofs and improved algorithms. *Artificial Intelligence*, 296, 103505.
- 5 Jonsson, P., Lagerkvist, V., & Roy, B. (2021). Fine-grained time complexity of constraint satisfaction problems. *ACM Transactions on Computation Theory*, 13(1).
- 6 Jonsson, P., Lagerkvist, V., Schmidt, J., & Uppman, H. (2021). The exponential-time hypothesis and the relative complexity of optimization and logical reasoning problems. *Theoretical Computer Science*, 892, 1–24.
- 7 Lagerkvist, V., & Roy, B. (2021). Complexity of inverse constraint problems and a dichotomy for the inverse satisfiability problem. *Journal of Computer and System Sciences*, 117, 23–39.

- 8 Lagerkvist, V., & Wahlström, M. (2020). Sparsification of SAT and CSP problems via tractable extensions. *ACM Transactions on Computation Theory*, 12(2).
- 9 Jonsson, P., & Lagerkvist, V. (2017). An initial study of time complexity in infinite-domain constraint satisfaction. *Artificial Intelligence*, 245, 115–133. [doi:10.1016/j.artint.2017.01.005](https://doi.org/10.1016/j.artint.2017.01.005)
- 10 Jonsson, P., Lagerkvist, V., Nordh, G., & Zanuttini, B. (2017). Strong partial clones and the time complexity of SAT problems. *Journal of Computer and System Sciences*, 84, 52–78.
- 11 Lagerkvist, V., & Wahlström, M. (2017b). The power of primitive positive definitions with polynomially many variables. *Journal of Logic and Computation*, 27(5), 1465–1488. [doi:10.1093/logcom/exw005](https://doi.org/10.1093/logcom/exw005)
- 12 Jonsson, P., Lagerkvist, V., & Nordh, G. (2015). Constructing NP-intermediate problems by blowing holes with parameters of various properties. *Theoretical Computer Science*, 581(100), 67–82. [doi:10.1016/j.tcs.2015.03.009](https://doi.org/10.1016/j.tcs.2015.03.009)
- 13 Lagerkvist, V. (2014). Weak bases of Boolean co-clones. *Information Processing Letters*, 114(9), 462–468.

Conference Proceedings

- 1 Baril, A., Couceiro, M., & Lagerkvist, V. (2022). An Algebraic Approach Towards the Fine-Grained Complexity of Graph Coloring Problems. In *Proceedings of the 52nd international symposium on multiple-valued logic (ISMVL-2022)*. To appear., IEEE Computer Society. Retrieved from <https://hal.archives-ouvertes.fr/hal-03424133>
- 2 Eriksson, L., & Lagerkvist, V. (2021). Improved algorithms for Allen’s interval algebra: A dynamic programming approach. In *Proceedings of the 30th international joint conference on artificial intelligence (IJCAI-2021)* (pp. 1873–1879). ijcai.org.
- 3 P. Jonsson, S. O., V. Lagerkvist. (2021). Reasoning short cuts in infinite domain constraint satisfaction: Algorithms and lower bounds for backdoors. In *Proceedings of the 27th international conference on principles and practice of constraint programming (CP-2021)* (Vol. 210, 32:1–32:20). Schloss Dagstuhl - Leibniz-Zentrum für Informatik.
- 4 Jonsson, P., & Lagerkvist, V. (2020). Lower bounds and faster algorithms for equality constraints. In *Proceedings of the 29th international joint conference on artificial intelligence (IJCAI-2020)* (pp. 1784–1790).
- 5 Lagerkvist, V. (2020). A new characterization of restriction-closed hyperclones. In *Proceedings of the 50th international symposium on multiple-valued logic (ISMVL-2020)* (pp. 303–308). [doi:10.1109/ISMVL49045.2020.00063](https://doi.org/10.1109/ISMVL49045.2020.00063)
- 6 Couceiro, M., Haddad, L., & Lagerkvist, V. (2019). Fine-grained complexity of constraint satisfaction problems through partial polymorphisms: A survey. In *Proceedings of the 49th international symposium on multiple-valued logic (ISMVL-2019)* (pp. 170–175). IEEE Computer Society.
- 7 Lagerkvist, V., & Nordh, G. (2019). On the strength of uniqueness quantification in primitive positive formulas. In *Proceedings of the 44th international symposium on mathematical foundations of computer science (MFCS-2019)* (Vol. 138, 36:1–36:15). Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik.
- 8 Lagerkvist, V., & Roy, B. (2019). The inclusion structure of Boolean weak bases. In *Proceedings of the 49th international symposium on multiple-valued logic (ISMVL-2019)* (pp. 31–36). IEEE Computer Society.
- 9 Jonsson, P., & Lagerkvist, V. (2018). Why are CSPs based on partition schemes computationally hard? In *Proceedings of the 43rd international symposium on mathematical foundations of computer science (MFCS-2018)* (Vol. 117, 43:1–43:15). Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik.
- 10 Couceiro, M., Haddad, L., Lagerkvist, V., & Roy, B. (2017). On the interval of Boolean strong partial clones containing only projections as total operations. In *Proceedings of the 47th international symposium on multiple-valued logic (ISMVL-2017)* (pp. 88–93). IEEE Computer Society.

- 11 Jonsson, P., Lagerkvist, V., & Roy, B. (2017). Time complexity of constraint satisfaction via universal algebra. In *Proceedings of the 42nd international symposium on mathematical foundations of computer science (MFCS-2017)* (17:1–17:15). Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik.
- 12 Lagerkvist, V., & Roy, B. (2017). A dichotomy theorem for the inverse satisfiability problem. In *Proceedings of the 37th iarcs annual conference on foundations of software technology and theoretical computer science (FSTTCS-2017)* (Vol. 93, 39:39–39:14).
- 13 Lagerkvist, V., & Wahlström, M. (2017a). Kernelization of constraint satisfaction problems: A study through universal algebra. In *Proceedings of the 23rd international conference on principles and practice of constraint programming (CP-2017)* (pp. 157–171). Springer International Publishing.
- 14 Lagerkvist, V., & Roy, B. (2016). A Preliminary Investigation of Satisfiability Problems Not Harder than 1-in-3-SAT. In *Proceedings of the 41st international symposium on mathematical foundations of computer science (MFCS-2016)* (Vol. 58, 64:1–64:14). Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik.
- 15 Jonsson, P., & Lagerkvist, V. (2015). Upper and lower bounds on the time complexity of infinite-domain CSPs. In *Proceedings of the 21st international conference on principles and practice of constraint programming (CP-2015)* (Vol. 9255, pp. 183–199). doi:10.1007/978-3-319-23219-5_14
- 16 Lagerkvist, V. (2015). Precise upper and lower bounds for the monotone constraint satisfaction problem. In *Proceedings of the mathematical foundations of computer science 2015 (MFCS-2015)* (Vol. 9234, pp. 357–368). doi:10.1007/978-3-662-48057-1_28
- 17 Lagerkvist, V., Wahlström, M., & Zanuttini, B. (2015). Bounded bases of strong partial clones. In *Proceedings of the 45th international symposium on multiple-valued logic (ISMVL-2015)* (pp. 189–194). Waterloo, Canada: IEEE Computer Society.
- 18 Jonsson, P., Lagerkvist, V., Schmidt, J., & Uppman, H. (2014). Relating the time complexity of optimization problems in light of the exponential-time hypothesis. In *Proceedings of the 39th international symposium on mathematical foundations of computer science (mfcs-2014)* (pp. 408–419). Berlin, Heidelberg: Springer-Verlag.
- 19 Lagerkvist, V., & Wahlström, M. (2014). Polynomially closed co-clones. In *Proceedings of the 44th international symposium on multiple-valued logic (ISMVL-2014)* (pp. 85–90). IEEE Computer Society.
- 20 Jonsson, P., Lagerkvist, V., & Nordh, G. (2013). Blowing holes in various aspects of computational problems, with applications to constraint satisfaction. In *Proceedings of the 19th international conference on principles and practice of constraint programming (CP-2013)* (Vol. 8124, pp. 398–414). doi:10.1007/978-3-642-40627-0_32
- 21 Jonsson, P., Lagerkvist, V., Nordh, G., & Zanuttini, B. (2013). Complexity of SAT problems, clone theory and the exponential time hypothesis. In *Proceedings of the 24th annual ACM-SIAM symposium on discrete algorithms (SODA-2013)* (pp. 1264–1277). SIAM.

Academic Award and Grants

- *Finkornig komplexitet för satisfierbarhets- och villkorsproblem (Fine-grained complexity of satisfiability and constraint satisfaction problems)*. The Swedish Research Council, starting grant, 2020-01-01.
- Recipient of the 2017 young researcher price of the Ruth and Nils-Erik Stenbäck foundation.

Workshops and Seminars

- Speaker at *Logic and Search (LASH-2017)*, Melbourne, Australia, 2017.
- Invited speaker at *QuantLA research seminar*, Dresden, Germany, 2017.
- *SAT and Interactions*, Dagstuhl, Germany, 2016.

Workshops and Seminars (continued)

- Speaker at *Workshop on Qualitative Spatial and Temporal Reasoning* (QUAC-2015), Dresden, Germany, 2015.

Refereeing

- Reviewer for the *American Mathematical Society* (AMS).
- Program committee member for the *29th International Joint Conference on Artificial Intelligence and the 17th Pacific Rim International Conference on Artificial Intelligence* (IJCAI-PRICAI-2020).
- Referee for several international conferences and journals in computer science, including the *International Conference on Principles and Practice of Constraint Programming* (CP), the *ACM-SIAM Symposium on Discrete Algorithms* (SODA), the *International Colloquium on Automata, Languages and Programming* (ICALP), and the *International Symposium on Theoretical Aspects of Computer Science* (STACS).
- Expert referee for three grant proposals from *Agence Nationale de la Recherche* (ANR), the *Czech Science Foundation* (GACR), and the *Austrian science Fund* (FWF).

Supervision

- Main supervisor of Leif Eriksson, PhD student, TCSLAB, Linköping University.
- Secondary supervisor of Baril Ambroise, PhD student, Université de Lorraine.
- Secondary supervisor of Abhijat Sharma, PhD student, TCSLAB, Linköping University.
- Secondary supervisor of George Osipov, PhD student, TCSLAB, Linköping University.
- Secondary supervisor of Biman Roy, PhD student, TCSLAB, Linköping University. Thesis title: *Applications of Partial Polymorphisms in (Fine-Grained) Complexity of Constraint Satisfaction Problems*, 2020.
- Examiner of Leif Eriksson, master's student, Linköping University. Thesis title: *Solving Temporal CSPs via Enumeration and SAT Compilation*, 2019.
- Supervisor of Adam Shi, master's student, Linköping University. Thesis title: *Automatic Enumeration of Intervals of Partial Co-Clones*, 2016.