

Thobias Kvalvik Høivik

Førde, Norway

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Research interests

Computational and parameterized complexity, algorithms, structural graph theory, graph games, logic and algebra in computer science, and mathematical foundations of computation.

Education

Western Norway University of Applied Sciences (HVL)

2024–present

Bachelor in Information Technology, specialization in Machine Learning Engineering and Artificial Intelligence

Førde, Norway

- Expected completion: 2027.
- Current weighted grade average: approximately 4.8/5.0.
- Completed 160 ECTS during the first two years of study, substantially exceeding the standard full-time progression.
- Degree supplemented by university mathematics courses at the University of Oslo and University of Bergen alongside full-time studies at HVL.

University of Bergen

2026–present

Additional coursework in mathematics

Bergen, Norway

- Currently taking courses in commutative algebra and topology.
- Coursework undertaken largely through independent study due to geographical distance from the university.

University of Oslo

2025–2026

Additional coursework at the Department of Mathematics

Oslo, Norway

- Completed university courses in abstract algebra, real analysis, mathematical logic, and advanced linear algebra alongside the bachelor programme.

Research and publications

Thobias Kvalvik Høivik and Erlend Raa Vågset

2026

Edge Geography is XNLP-hard for Pathwidth and in XP for Tree-Partition Width.

Published in the proceedings of the European Symposium on Algorithms (ESA 2026), LIPIcs vol. 388.

- Established XNLP-hardness of Edge Geography parameterized by pathwidth, resolving a longstanding open question concerning its parameterized complexity.
- Developed an XP algorithm for Edge Geography on graphs of bounded tree-partition width.
- Presented the paper at ESA 2026 in L'Aquila, Italy.

Ongoing research in theoretical computer science

2026–present

- Investigating computational-complexity questions arising in combinatorial commutative algebra.
- Exploring complexity questions in computational algebraic topology.

Teaching and academic experience

Student Assistant

2025–present

Western Norway University of Applied Sciences

Førde, Norway

- Assisted in courses including Discrete Mathematics, Introduction to Mathematics, and Distributed Systems and Networking Technology. Currently: Statistics for Engineers, Advanced Discrete Mathematics.

- Guided students through exercises and problem solving, graded assignments, and provided academic feedback.

Mathematics Mentor

Western Norway University of Applied Sciences

Spring 2025

Førde, Norway

- Provided individual academic support and mathematics guidance to a student.

Selected academic preparation

Mathematics	Abstract Algebra; Real Analysis; Mathematical Logic; Advanced Linear Algebra; Commutative Algebra; Topology; Discrete Mathematics; Advanced Discrete Mathematics.
Computer science	Algorithms and Data Structures; Distributed Systems; Operating Systems; Databases; Programming and Software Development.
Selected grades	Groups, Rings and Fields (A); Discrete Mathematics I (A); Advanced Discrete Mathematics (A); Algorithms and Data Structures (A); Mathematical Logic (B); Advanced Linear Algebra (B).

Academic outreach and independent projects

Personal academic website

Ongoing

- Develops a personal website for writing about mathematical computer science and communicating technical ideas.
- Builds interactive demonstrations of concepts from algorithms, complexity theory, and combinatorial games.

Microcontroller noise as a source of randomness

2025

- Designed and carried out an independent experimental project investigating electrical noise from a microcontroller as a potential source of randomness.

Additional work experience

Crew Member and Shift Leader

Burger King Førde

2021–2025

Førde, Norway

- Led teams during shifts, trained new employees, and handled operational responsibilities in a high-paced work environment.

Technical skills and languages

Programming: Python, Java, C, C++, C#, JavaScript, Haskell, Rust.

Tools: Linux, Git/GitHub, L^AT_EX, TikZ/Ipe.

Languages: Norwegian (native), English (fluent).