

# Alex Bergman

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🌐 <http://alex-lukas-bergman.github.io/>



## Current Occupation

2021 – ... 📖 **PhD student** Lund university. My advisor is Professor Alexandru Aleman.

## Research Publications

### Preprints

- 1 A. Aleman and A. Bergman, *Invariant subspaces for generalized differentiation and Volterra operators*, 2025. 🔗 DOI: 10.48550/arXiv:2503.08443. arXiv: 2503.08443.
- 2 A. Bergman, *Hörmander's inequality and point evaluations in de Branges space*, 2024. 🔗 DOI: 10.48550/arxiv:2411.02226. arXiv: 2411.02226.

### Journal Articles

- 1 A. Bergman, "A sharp entropy condition for the density of angular derivatives," *C. R. Math. Acad. Sci. Paris*, vol. 363, pp. 29–33, 2025, ISSN: 1631-073X, 1778-3569. 🔗 DOI: 10.5802/crmath.695.
- 2 A. Bergman, "On cyclicity in de Branges-Rovnyak spaces," *Indiana Univ. Math. J.*, vol. 73, no. 4, pp. 1307–1329, 2024, ISSN: 0022-2518, 1943-5258. 🔗 DOI: 10.1512/iumj.2024.73.60011.
- 3 A. Bergman and O. Rubin, "Chebyshev polynomials corresponding to a vanishing weight," *J. Approx. Theory*, vol. 301, Paper No. 106048, 25, 2024, ISSN: 0021-9045, 1096-0430. 🔗 DOI: 10.1016/j.jat.2024.106048.

## Academic Talks

- 2025 📖 **Hörmander's inequality in de Branges space**, Conference "Math bench sessions, Krakow", Poland.
- 2024 📖 **Hörmander's inequality in de Branges space**, Analysis seminar, KU Leuven, Belgium.
- 📖 **A sharp entropy condition for the density of angular derivatives**, Conference "Operators and analytic function spaces", Luminy, France.
- 📖 **Smooth invariant chains in de Branges space**, Conference "Advanced courses in operator theory and complex analysis", Tenerife, Spain.
- 📖 **Invariant subspaces for generalized differentiation and Volterra operators**, Analysis seminar, NTNU, Norway.
- 📖 **Invariant subspaces for generalized differentiation and Volterra operators**, Analysis seminar, King's college London, England.

## Academic Talks (continued)

- 2023
  - **Cyclic Vectors in de Branges-Rovnyak Spaces**, Analysis seminar, Lund university, Sweden.
  - **Smooth invariant chains in de Branges space**, Conference "Math bench sessions", Krakow, Poland.
  - **Invariant subspaces for second order ODE**, Analysis seminar, Stockholm university, Sweden.
  - **Invariant subspaces for second order ODE**, Conference "International Conference on Spectral Theory and Approximation", Lund, Sweden.
  - **On cyclicity in de Branges-Rovnyak spaces**, Conference "Advanced courses in operator theory and complex analysis", Thessaloniki, Greece.
- 2022
  - **Interpolation spaces between  $H^1$  and  $H^\infty$** , Math seminar, Umeå university, Sweden.

## Grants

- 2024
  - **The Fund of the Torsten and Fanny Brodén Foundation** General research grant. The Royal Physiographic Society of Lund.
  - **The Bokelund Society Travel Grant** Travel Grant. Faculty of Science, Lund university.
- 2023
  - **The Fund of the Walter Gyllenberg Foundation** General research grant. The Royal Physiographic Society of Lund.
- 2022-2024
  - **Thorild Dahlgrens och Folke Lannérs stipendiefond** Travel grant. Awarded several times.

## Academic Visits

### Research Stays











- 2024
  - **Research stay hosted by Profesor Alexei Poltoratski**, November 2024, University of Wisconsin, Wisconsin, USA.
  - **Research stay hosted by Professor Alexander Pushnitski**, May 2024, King's college, London, England

### Summer Schools

- 2023
  - **Analysis, arithmetics and geometry: zeta-functions, trace formulas, and around**, Mittag-Leffler institute, Stockholm, Sweden.
- 2022
  - **Summer school in Harmonic analysis**, Bonn/Kopp, Germany.

## Teaching

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- 2025        **Envariabelanalys (analysis in one variable)** Spring, Lund university.
- 2024        **Analysis in several variables I** Fall, Lund university.
-     **Analysis in one variable** Fall, Lund university.
-     **Envariabelanalys (analysis in one variable)** Spring, Lund university.
- 2023        **Analysis in one variable** Fall, Lund university.
-     **Envariabelanalys (analysis in one variable)** Spring, Lund university.
- 2022        **Analysis in several variables II** Fall, Lund university.
-     **Analysis in one variable** Fall, Lund university.
-     **Envariabelanalys (analysis in one variable)** Spring, Lund university.
- 2021        **Analysis in one variable** Fall, Lund university.

## Referee Work

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I have been a referee for the following journals.

**Analysis and Mathematical Physics**

## Education

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- 2018-2021    From 2018 to 2021 I was a student at the department of mathematics at Lund university.
- Master thesis (2021):** *Interpolation spaces between Hilbert and Banach spaces of analytic functions*
- Bachelor thesis (2020):** *Weak type spectral mapping theorems for strongly continuous groups of operators*

## Community outreach and Popular Science

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- 2024    **Forskaruppsats** I participated in an interview study for high school students at "Polhemskolan" (Lund, Sweden) aspiring to be scientists.
- Question and answer session.** I answered questions from high school students in Skåne, Sweden about mathematics over the phone.
- 2023    **Question and answer session.** I answered questions from high school students in Skåne, Sweden about mathematics over the phone.

## Other departmental duties

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### I was a member of the following hiring committees

- 2025      PhD student in dynamical systems at Lund university.
- 2023      PhD student in representation theory at Lund university.

### I am or have been a member of the following boards.

- 2024-...      I am currently a member of the Mathematics program council at Lund university. The purpose of the council is education development. My role is as the PhD student representative.