

# Elias Riedel Gårding

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Born 1995-11-17, Stockholm

## Research experience

- 2019 **Research project in quantum computation**  
Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL)  
Supervisors: MER Dr Marc-André Dupertuis and MER Dr Nicolas Macris  
Preprint: *Bell Diagonal and Werner state generation: entanglement, non-locality, steering and discord on the IBM quantum computer* [\[PDF\]](#) (first author)
  - Second prize in the 2019 IBM Q Best Paper Award. [\[HTML\]](#)
  - Designed quantum circuits, programmed simulations, wrote major parts of the paper.
- 2018 **Cambridge Mathematics Placement**  
Department of Biochemistry, University of Cambridge  
Supervisors: Dr Mark Bostock and Dr Daniel Nietlispach  
Title: *Sparse sampling schedules for multidimensional NMR spectroscopy*
  - Developed software and a new mathematical method.
  - Optimised existing software for a fivefold speedup.
- 2017 **Summer Undergraduate Research Fellowship (SURF)**  
Department of Electrical Engineering, California Institute of Technology (Caltech)  
Supervisors: Dr Anatoly Khina and Asst Prof Victoria Kostina  
Paper: *Control over Gaussian Channels With and Without Source-Channel Separation* [\[DOI\]](#)
  - Published in *IEEE Transactions on Automatic Control*. Second author.
  - Developed a simulation incorporating several information-theoretic algorithms.
- 2017 **Undergraduate thesis research**  
Department of Mathematics, Royal Institute of Technology (KTH)  
Supervisor: Dr Douglas Lundholm  
Thesis: *Geometric algebra, conformal geometry and the common curves problem* [\[PDF\]](#)
  - Assessed the potential of conformal geometric algebra for use in cryo-electron microscopy.

## Education & academic qualifications

- 2018- **Master of Science in Engineering Physics**  
Royal Institute of Technology (KTH)
  - Specialisation: *Subatomic and Astrophysics*.
- 2019
  - Exchange at École Polytechnique Fédérale de Lausanne (EPFL).
- 2017-2018 **Master of Advanced Studies in Applied Mathematics (Part III)**  
University of Cambridge
  - Courses in theoretical physics, covering quantum field theory and gravitation.
  - Pass with distinction (the highest grade).
  - Jennings Prize from Wolfson College for examination results.
  - Part III Michaelmas Seminar: *Geometric/Clifford algebra: A better vector algebra for physics*.
  - Part III Lent Seminar: *Symmetry made coherent*.

- 2014-2017 **Bachelor of Science in Engineering Physics**  
 Royal Institute of Technology (KTH)  
 • Grade average: 4.966 (mandatory courses: 4.977) out of 5.000.
- 2016 **Summer school in nonlinear optics**  
 Joint Research Centre of Photonics (JORCEP), Zhejiang University  
 Title: *All-Optical Wavelength Conversion for NRZ-OOK Signal based on Four-Wave Mixing in a Silicon Waveguide*
- Standardised tests**
- 2019 • GRE. Verbal reasoning: 170/170 (99th percentile).  
 Quantitative reasoning: 167/170 (90th percentile).  
 Analytical writing: 4.5/6.0 (81st percentile).
- 2019 • Physics GRE: 970/990 (93rd percentile).
- 2019 • TOEFL. Reading: 29/30, Listening: 30/30, Speaking: 23/30, Writing: 29/30.
- 2016 • IELTS: 8.5/9.0.
- 2012 • Swedish Scholastic Aptitude Test: 2.0/2.0.
- Scholarships for academic achievements**
- 2017 • *Henrik Göransson's Sandviken Scholarship Foundation.*
- 2017 • *KTH's general student scholarships.*
- 2017 • *Kamreraren Hans Adolf Branders pensions- och stipendiestiftelse.*
- 2014 • *Adjunkt Klas Ryrbergs stipendiestiftelse.*
- 2011-2014 **Upper secondary education**  
 Norra Real, Stockholm

## Other skills & merits

- Scientific outreach**
- 2019 • *Our Theory of Very Nearly Everything.* [\[PDF\]](#) [\[HTML\]](#)  
 Popular science article about quantum field theory and the Standard Model of particle physics.  
 In *Plus*, an online Cambridge-based mathematical magazine.
- Competitive programming**
- 2019 • 42nd place (out of 222), Nordic Collegiate Programming Contest (NCPC), one-man team.
- 2019 • 4th place (out of 25), Ericsson Programming Challenge, one-man team.
- 2014 • 7th place (out of 33), Programming Olympiad (national yearly high-school contest) finals.
- 2013 • 16th place (out of 40), Programming Olympiad finals.
- Software skills**
- Languages: Python, C/C++, Haskell, Java, Lua, Rust, Idris, Coq, x86 assembly, zsh/bash, ...
- Tools: GNU/Linux, Arch Linux, Git, SVN, ..., SciPy, Mathematica, MATLAB, COMSOL, GEANT4.
- Language skills**
- Swedish (native speaker)
- English (fluent)
- French (fair knowledge)
- Spanish, Japanese & Mandarin Chinese (basic familiarity)
- 2014- Aikido practitioner (3rd kyu Aikikai) at Vanadis Aikido Dojo, Stockholm.
- 2013-2014 Scout leader at Hedvig Eleonora Scoutkår, Stockholm.