

# Dr. Rok Cestnik

## Curriculum Vitae

Centre for Mathematical Sciences  
Lund University, Sweden

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🌐 [rokcestnik.com](http://rokcestnik.com)

📄 [github.com/rokcestnik](https://github.com/rokcestnik)



## Education

- 2016–2020 **Doctor of Natural Sciences**, *Free University Amsterdam (Research conducted primarily at University Potsdam)*, Amsterdam (Netherlands), part the innovative training network (ITN) under project COSMOS funded by Marie Skłodowska-Curie, [link\\_to\\_my\\_thesis](#).
- 2014–2015 **Master in Physics of Complex Systems**, *Institute for Cross-Disciplinary Physics and Complex Systems*, Palma de Mallorca (Spain).
- 2011–2014 **Bachelor in Physics**, *University of Ljubljana*, Ljubljana (Slovenia).

## Work Experience

- 2023–present **Postdoc in nonlinear dynamics**, *Lund University*, Lund (Sweden).  
Independent scientific research; co-evolutionary oscillatory networks.  
*Parental leave: Oct–Dec 2023 and Aug–Nov 2025.*
- 2019–2023 **Postdoc in nonlinear dynamics**, *University Potsdam*, Potsdam (Germany).  
Independent scientific research; complex oscillatory systems, funded by the German Research Foundation, DFG.
- 2018 **Data Science Intern**, *Ambrosys GmbH (Ltd.)*, Potsdam (Germany).  
Time series forecasting using artificial neural networks.
- 2013–2014 **Teaching assistant**, *University of Ljubljana*, Ljubljana (Slovenia).  
Bachelor course on programming in C.

## Awards

- 2024 Editor's Suggestion Physical Review Letter
- 2022 Best talk from an early career researcher – Dynamics Days Europe, Aberdeen (Scotland).

## Skills

- Dynamical systems, nonlinear analysis, and mathematical modeling.
- Complex analysis, invariant manifolds, and exact reduction methods.
- Programming: C/C++, Python, Bash, Mathematica.
- Numerical simulation, data-driven modeling, and machine learning.
- Collaborative research workflows (Git, version control).
- Scientific writing ( $\text{\LaTeX}$ ) and presentation.

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## Publications

- 2025 Rok Cestnik, *Two-phase quadratic integrate-and-fire neurons: Exact low-dimensional description for ensembles of finite-voltage neurons*, (in revision).
- 2025 Rok Cestnik and Erik Martens, *Next-Generation Reservoir Computing for Dynamical Inference*, (in revision) - [arXiv](#).
- 2025 Felix Augustsson, Erik Martens and Rok Cestnik, *Exact Dimensional Reduction for Quasi-Linear ODE Ensembles*, (in revision) - [arXiv](#).
- 2025 Diego Pazo and Rok Cestnik, *Low Dimensional Dynamics of Globally Coupled Complex Riccati Equations: Exact Firing-rate Equations for Spiking Neurons with Clustered Substructure*, Physical Review E 111, L052201 - [link](#), [arXiv](#).
- 2024 Rok Cestnik and Erik Martens, *Continuum limit of the adaptive Kuramoto model*, Chaos 35, 013109 - [link](#), [arXiv](#).
- 2024 Rok Cestnik and Erik Martens, *Integrability of a globally coupled complex Riccati array: quadratic integrate-and-fire neurons, phase oscillators and all in between*, Physical Review Letters 132, 057201 - [link](#), [arXiv](#).
- 2023 Bastian Pietras, Rok Cestnik and Arkady Pikovsky, *Exact finite-dimensional description for networks of globally coupled spiking neurons*, Physical Review E 107, 024315 - [link](#), [arXiv](#).
- 2022 Rok Cestnik, Erik Mau and Michael Rosenblum, *Inferring oscillator's phase and amplitude response from a scalar signal exploiting test stimulation*, New Journal of Physics 24, 123012 - [link](#), [arXiv](#).
- 2022 Rok Cestnik and Arkady Pikovsky, *Exact finite-dimensional reduction for a population of noisy oscillators and its link to Ott-Antonsen and Watanabe-Strogatz theories*, Chaos 32, 113126 - [link](#), [arXiv](#).
- 2022 Rok Cestnik and Arkady Pikovsky, *Hierarchy of exact low-dimensional reductions for populations of coupled oscillators*, Physical Review Letters 128, 054101 - [link](#), [arXiv](#).
- 2021 Gloria Cecchini, Rok Cestnik and Arkady Pikovsky, *Impact of network characteristics on network reconstruction*, Physical Review E 103 022305 - [link](#), [arXiv](#).
- 2020 Rok Cestnik, *Inferring oscillatory dynamics from data*, PhD Thesis - [link](#).
- 2019 Rok Cestnik and Markus Abel, *Inferring the dynamics of oscillatory systems using recurrent neural networks*, Chaos 29, 063128 - [link](#), [arXiv](#).
- 2018 Rok Cestnik and Michael Rosenblum, *Inferring the phase response curve from observation of a continuously perturbed oscillator*, Scientific Reports 8 13606 - [link](#), [arXiv](#).
- 2017 Rok Cestnik and Michael Rosenblum, *Reconstructing networks of pulse-coupled oscillators from spike trains*, Physical Review E 96, 012209 - [link](#), [arXiv](#).

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## Recent conference presentations

- 2025 Oral contribution at the *Dynamics Days Europe*, Thessaloniki (Greece).
- 2024 Oral contribution at the *Dynamics Days Europe*, Bremen (Germany).
- 2023 Organizing a minisymposium and oral contribution at the *Dynamics Days Europe*, Naples (Italy).
- 2023 Oral contribution at the *SIAM Conference on Applications of Dynamical Systems*, Portland OR (USA).
- 2022 Oral contribution at the *Dynamics Days Europe*, Aberdeen (Scotland).

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## Languages

**English (fluent), Slovene (native), Spanish (advanced)**

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## Recommendations

Erik Martens *Roskilde University* (Denmark), [emartens@ruc.dk](mailto:emartens@ruc.dk)

Arkady Pikovsky *University Potsdam* (Germany), [pikovsky@uni-potsdam.de](mailto:pikovsky@uni-potsdam.de)

Michael Rosenblum *University Potsdam* (Germany), [mros@uni-potsdam.de](mailto:mros@uni-potsdam.de)

Andreas Daffertshofer *Free University Amsterdam* (Netherlands), [a.daffertshofer@vu.nl](mailto:a.daffertshofer@vu.nl)

Victor Eguiluz *Inst. for Cross-Disciplinary Physics & Complex Systems* (Spain), [victor@ifisc.uib-csic.es](mailto:victor@ifisc.uib-csic.es)

Markus Abel *Ambrosys GmbH (Ltd.)* (Germany), [markus.abel@ambrosys.de](mailto:markus.abel@ambrosys.de)