



# Dr Varazdat Stepanyan

*Thesis:* **Quantum and Classical Phenomena in the Structure of Biopolymers**



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## EXPERIENCE

OCT 2021 – PRESENT

### Yerevan State University

Researcher and Lecturer

Physics of Macromolecules lab @ RIP, YSU

JUL 2021 – PRESENT

### Yerevan Physics Institute

Research Fellow

Quantum Science and Technology lab @ AANL, YerPHI

JAN 2019 – PRESENT

### American University of Armenia

Adjunct Lecturer

Teaching Assistant before July 2023

APR 2022 – SEP 2022

### Biosim AI

Research Consultant

FEB 2018 – FEB 2019

### Student Council of the Faculty of Physics

President

## COURSES TAUGHT

### Yerevan State University

Thermodynamics and Molecular Physics, Nonequilibrium Thermodynamics, Biophysics, Optimization

### American University of Armenia

Mechanics, Math Modeling Applications, Theory of Computing, Quantum Computing

## AWARDS

### Best Master of the Republic of Armenia in the Sphere of IT Award, Second Grade Prize

*Issued by The Ministry of Education, Science, Culture and Sports of the Republic of Armenia, JUN 2022*

### Best Master of Yerevan State University Faculty of Physics Award after First Dean Norayr Qocharyan

*Issued by Faculty of Physics of Yerevan State University, JUN 2022*

## EDUCATION

2022 – 2025

### PhD

Condensed Matter Physics

Yerevan State University

2020 – 2022

### Master of Science

*Diploma with Honour (Red)*

Physics of Macromolecules

Yerevan State University

2018 – 2022

### Bachelor of Computer Science

Computer Science

American University of Armenia

2016 – 2020

### Bachelor of Physics

*Diploma with Honour (Red)*

Department of Physics

Yerevan State University

## LANGUAGES

ARMENIAN

Native

ENGLISH

Fluent

RUSSIAN

Fluent

## PROJECTS

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- **Quantum analog computing and sensing:** 2024–2027
- **Information theory methods in statistical physics and data science:** 2022–2026
- **Quantum and classical phenomena in the structure of biopolymers:** 2022–2025
- **Quantum information and machine learning: common approaches and tools:** 2021–2023
- **Functional properties of biosensors and structure and hybridization of nucleic acids:** 2021–2022

## REPORTS

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- **Coarse-graining the finer structure of macromolecular interactions:** (Co-author) The polyelectrolyte with a disorder over short-range interactions
- **QTD2023:** (Poster) Energy Distributions in Quantum Mechanics
- **QTD2022:** (Poster) Photon Cooling: Linear vs Nonlinear
- **HEUREKA2020:** (Talk) NP-complete problems from physics perspective
- **HEUREKA2020:** (Co-author) Quantum classification of even and odd functions as an extension of Deutsch algorithm
- **ANAM2019:** (Talk) Short-range disorder and electrostatic interactions in macromolecule

## PUBLICATIONS

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- *Negative thermodynamic pressure: No-go theorem and yes-go examples* **Phys. Rev. E** 2025 v. 111, pp. L042105  
**doi:10.1103/PhysRevE.111.L042105**
- *No Bose-Einstein Condensation in Closed Systems with Linear Dynamics* **Arm. J. Phys.** 2024 v. 17, pp. 65–70  
**doi:10.54503/18291171-2024.17.3-65**
- *Thermodynamics of an Ideal Electron Gas Localized in a Thin Spherical CdSe Nanolayer* **J. Cont. Phys.** 2024 v. 59, pp. 172–178 **doi:10.1134/S1068337224700312**
- *Sequence disorder-induced first order phase transition in confined polyelectrolytes* **J. Chem. Phys.** 2024 v. 161, pp. 134906 **doi:10.1063/5.0228162**
- *Thermal transitions in a one-dimensional, finite-size Ising model* **JSTAT** 2022 v. 3, pp. 033202  
**doi:10.1088/1742-5468/ad2679**
- *Energy densities in quantum mechanics* **Quantum** 2024 v. 8, pp. 1223 **doi:10.22331/q-2024-01-10-1223**
- *Photon cooling: Linear versus nonlinear interactions* **Phys. Rev. A** 2022 v. 106, pp. 032214  
**doi:10.1103/PhysRevA.106.032214**
- *Helix-Coil Transition in Heterogeneous Biopolymers: Influence of Fixing Bond Scale* **J. Cont. Phys.** 2022 v. 57, pp. 308–312 **doi:10.1134/S1068337222030057**
- *Thermodynamics of Physical Approximations to Non Deterministic Polynomial Complete Problems* **J. Cont. Phys.** 2022 v. 57, pp. 36–40 **doi:10.3103/S1068337222010145**
- *The Rouse Model of Viscoelasticity and Diffusion Behavior of Chromatin* **J. Cont. Phys.** 2020 v. 55, pp. 254–258  
**doi:10.3103/S1068337220030123**