



# 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 until summer of 2025  
Physics of Macromolecules lab @ RIP, YSU

Jul 2021 – Present  
**Alikhanyan National Laboratory**  
Research Fellow contract  
Quantum Science and Technology lab @ AANL, YerPHI

Jan 2019 – Present  
**American University of Armenia**  
Adjunct Lecturer contract  
Teaching Assistant before Jul 2023

Apr 2022 – Sep 2022  
**Biosim AI**  
Research Consultant  
Molecular dynamics and drug design

Aug 2020 – Mar 2023  
**Dasa2**  
Tutor  
Advanced physics and math for high school students

Feb 2018 – Feb 2019  
**Student Council of YSU**  
President of the faculty of physics student council  
Organizing and conducting student / faculty meetings

Jan 2017 – Feb 2019  
**Matemat**  
Full stack web developer  
Working on development of major news websites

## 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

## 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

## Grants and Projects

*Higher Education and Science Committee of the Republic of Armenia*

- **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

- **Conference on Nonextensive Statistical Physics Dedicated to Constantino Tsallis' 82nd Birthday:** (Talk) Negative Thermodynamic Pressure
- **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

- *Canonic hemoglobin–oxygen equilibrium: Reassessing the role of cooperativity* **J. Chem. Phys.** 2026 v. 164, pp. 034109  
**doi:10.1063/5.0310372**
- *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**