



Dr Varazdat Stepanyan

Thesis: Quantum and Classical Phenomena in the Structure of Biopolymers



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Experience

<p>Yerevan State University Researcher and lecturer until summer of 2025 <i>Physics of Macromolecules lab @ RIP, YSU</i></p> <p>Alikhanyan National Laboratory Research Fellow contract <i>Quantum Science and Technology lab @ AANL, YerPHI</i></p> <p>American University of Armenia Adjunct Lecturer contract <i>Teaching Assistant before Jul 2023</i></p> <p>Biosim AI Research Consultant <i>Molecular dynamics and drug design</i></p> <p>Dasa2 Tutor <i>Advanced physics and math for high school students</i></p> <p>Student Council of YSU President of the faculty of physics student council <i>Organizing and conducting student / faculty meetings</i></p> <p>Matemat Full stack web developer <i>Working on development of major news websites</i></p>	<p>Oct 2021 – Present</p> <p>Jul 2021 – Present</p> <p>Jan 2019 – Present</p> <p>Apr 2022 – Sep 2022</p> <p>Aug 2020 – Mar 2023</p> <p>Feb 2018 – Feb 2019</p> <p>Jan 2017 – Feb 2019</p>
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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

<p>2022 – 2025</p>	<p>PhD Condensed Matter Physics Yerevan State University</p>
<p>2020 – 2022</p>	<p>Master of Science <i>Diploma with Honour (Red)</i> Physics of Macromolecules Yerevan State University</p>
<p>2018 – 2022</p>	<p>Bachelor of Computer Science Computer Science American University of Armenia</p>
<p>2016 – 2020</p>	<p>Bachelor of Physics <i>Diploma with Honour (Red)</i> Department of Physics Yerevan State University</p>

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 extention 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