Dmitri Kartofelev, PhD

Physicist, Researcher & Lecturer

Tallinn University of Technology · Department of Cybernetics · Laboratory of Solid Mechanics

Dr. Dmitri Kartofelev is an Estonian physicist and researcher based at the Laboratory of Solid Mechanics within the Department of Cybernetics at TalTech. His academic work lies at the cross-section of pure physics, applied mathematics, and mechanical engineering, exploring complex wave behaviors and nonlinear material dynamics.

Core Areas of Research

- **Musical Acoustics:** Investigation of the structural mechanics governing musical instruments. He specializes in string-barrier interaction dynamics (e.g., how piano hammers and guitar strings vibrate against curved frets/bridges) and the nonlinear dynamics of sound synthesis.
- **Nonlinear Dynamics & Chaos Theory:** Exploration of systems where minor inputs yield disproportionate, unpredictable outputs. His studies include chaotic pendulums, bifurcations, fractal patterns, and limits of predictability in physics modeling.
- **Solid Body Mechanics & Materials:** Detailed analysis of how mechanical waves propagate through non-homogeneous mediums, such as the microstructural properties and wave attenuation of wool felt (crucial for piano crafting) and advanced fiber-reinforced composites.

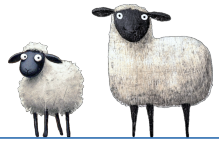
Academic & Teaching Roles

At TalTech, Dr. Kartofelev is actively involved in training the next generation of engineers and scientists, covering advanced physical theories alongside core computation courses:

- **Nonlinear Dynamics (YFX1560):** Covers mathematical formulations of chaos, Lorenz equations, Mandelbrot sets, and numerical modeling of chaotic processes.
- **Introduction to Programming using Python (YFX0500):** Provides foundational programming architecture tailored explicitly for engineering and natural science tracks.

Background & Education

He successfully completed his PhD in Natural Sciences at Tallinn University of Technology in 2014. His doctoral dissertation, titled *"Nonlinear Sound Generation Mechanisms in Musical Acoustics,"* established foundational frameworks for explaining complex interactions between vibrating strings and solid structural constraints.



https://www.tud.ttu.ee/web/dmitri.kartofelev/
dmitri.kartofelev@taltech.ee
(+372) 620 4173