

Dmitri Kartofelev, PhD

Expanded Curriculum Vitae

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"No problem can withstand the assault of sustained thinking." – Voltaire

Personal information

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|----------------|------------------|-------------|----------|
| Date of birth | April 12, 1985 | Nationality | Estonian |
| Place of birth | Tallinn, Estonia | Citizenship | Estonian |

Education

Higher education

2009–2014 **Doctorate Degree in Natural and Exact Sciences (Doctor of Philosophy in Applied Mechanics), Curriculum: Technical Physics (Engineering physicist, Applied Mechanics), Institute of Cybernetics, Laboratory of Nonlinear Dynamics, Tallinn University of Technology (TalTech).**

Level in the international standard classification of education: ISCED 8

Semester abroad Aalto University, *Department of Signal Processing and Acoustics, School of Electrical Engineering, Espoo, Finland, Jan.–Jun. 2013*

Thesis title Nonlinear Sound Generation Mechanisms in Musical Acoustics

Thesis supervisor Anatoli Stulov, PhD

2007–2009 **Master's Degree in Natural Sciences, Curriculum: Technical Physics (Applied Mechanics), Institute of Physics, Department of Science, Tallinn University of Technology.**

Level in the international standard classification of education: ISCED 7

Thesis title Analysis of Vibration Spectra of Piano String

Thesis supervisor Anatoli Stulov, PhD

2004–2007 **Bachelor's Degree in Natural Sciences, Curriculum: Technical Physics, Institute of Physics, Department of Science, Tallinn University of Technology.**

Level in the international standard classification of education: ISCED 6

Thesis title Action of Traveling Wave on a Piano Bridge

Thesis supervisor Anatoli Stulov, PhD

Secondary education

2001–2004 **High school, Tallinn Väike-Õismäe High School, Tallinn, Estonia.**

Level in the international standard classification of education: ISCED 3

Experience

Working, institution and position held

Jan. 2017–present **Researcher, Laboratory of Solid Mechanics, Department of Cybernetics, School of Science, Tallinn University of Technology.**

Responsibilities Carry out scientific research on the various topics of musical acoustics. Devising or helping to draw up new research proposals and applying for funding and grants.

Address Ehitajate Rd. 5, 19086 Tallinn, Estonia

Employers Andrus Salupere, PhD; Jaan Kalda, PhD

Sep.–Dec. 2016 **Researcher, Institute of Cybernetics, Laboratory of Nonlinear Dynamics, Tallinn University of Technology.**

Responsibilities See previous entry.

Address Akadeemia Rd. 21B, 12618 Tallinn, Estonia
Employers Andrus Salupere, PhD; Jaan Kalda, PhD

2013–2016 **Junior researcher**, *Institute of Cybernetics, Centre for Nonlinear Studies, Laboratory of Nonlinear Dynamics*, Tallinn University of Technology.

Responsibilities See previous entry.

Address Akadeemia Rd. 21B, 12618 Tallinn, Estonia
Employers Anatoli Stulov, PhD; Jüri Engelbrecht, DSc; Jaan Kalda, PhD

2019–2022 **Pre-IB Physics Teacher**, *Audentes International School*.

Responsibilities To teach Pre-IB level physics in accordance with the curriculum of the International Baccalaureate (IB) Diploma Programme (DP).

Address Tondi 84/1, 11316 Tallinn, Estonia
Employer Anneliis Kõiv, School Principal/IB coordinator

Feb.–Aug. 2015 **Vocational physics teacher**, *Tallinn Industrial Education Centre*.

Responsibilities To give vocational physics lessons. Plan study programs to meet students' needs, interests and abilities. Ensuring compliance of teaching objectives to state law and curriculum, administrative regulations and procedures.

Address Sõpruse Ave. 182, 13424 Tallinn, Estonia
Employers Paul Alekand, Director; Irina Maksimova

Feb.–Jun. 2013 **Visiting researcher**, *Department of Signal Processing and Acoustics, School of Electrical Engineering*, Aalto University.

Responsibilities Carry out theoretical and experimental investigation on the topic of stiff string vibration that is influenced by different nonlinear support and contact conditions.

Address Otakaari 5A, 02150 Espoo, Finland
Employer Vesa Välimäki, PhD (Professor of audio signal processing)

2009–2013 **Engineer**, *Institute of Cybernetics, Department of Mechanics and Applied Mathematics, Centre for Nonlinear Studies*, Tallinn University of Technology.

Responsibilities Carry out scientific research on the various topics of musical acoustics. Devising or helping to draw up new research proposals and applying for funding and grants.

Address Akadeemia Rd. 21B, 12618 Tallinn, Estonia
Employer Anatoli Stulov, PhD (Senior researcher)

2008–2009 **Technician**, *Institute of Cybernetics, Department of Mechanics and Applied Mathematics, Centre for Nonlinear Studies*, Tallinn University of Technology.

Responsibilities See previous entry.

Address Akadeemia Rd. 21B, 12618 Tallinn, Estonia
Employer Anatoli Stulov, PhD (Senior researcher)

[Teaching at Tallinn University of Technology](#)

2019–present **Lecturer (Introduction to Programming in Python, course code in TalTech curriculum: YFX 0500)**, *Laboratory of Solid Mechanics, Department of Cybernetics, School of Science*, Tallinn University of Technology.

Responsibilities To prepare and give lectures. Evaluating and assessing students' progress. Monitoring individual student progress. Instructing students on proper use of materials, aids and textbooks.

Course syllabus Essence of programming. Overview of programming language Python and its tools. Python syntax and program structure. Standard data types (int, float, complex, str/unicode, bool, list, tuple, dict, set, object, type), defining and using objects. Defining and using variables. Expressions (operations with objects of various data types: +, -, *, /, //, **, %, not, and, or, |, &, ^, [], (), in, is, <, >, ==, !=, priority of operations) and statements (del, for, while, if-elif-else, try-except/with, break/continue/pass). Standard functions (print, range, type transformations, etc), defining and using functions (def, return statements, lambda expression), generators (yield statement), decorators (@ operator). Basics of object-oriented programming (class statement). Standard packages, creating and using modules (import, from statements), installing packages (Anaconda, pip). Creating and using data files. Packages for scientific computing (NumPy, SciPy, matplotlib) and work environments (Thonny, PyCharm, Spyder, Jupyter, IPython).

Address TalTech Campus, Ehitajate Rd. 5, 19086 Tallinn, Estonia
Employer Andrus Salupere, PhD

2016–present **Lecturer (Nonlinear Dynamics, course code in TalTech curriculum: EMR 0060)**, *Laboratory of Solid Mechanics, Department of Cybernetics, School of Science*, Tallinn University of Technology.

Responsibilities To prepare and give lectures. Evaluating and assessing students' progress. Monitoring individual student progress. Instructing students on proper use of materials, aids and textbooks.

Course syllabus Nonlinearity and nonlinear world. The sources of nonlinearities due to physics and geometry. Nonlinear mathematical models. Basic theory of ODEs and practical numerical integration. Attractors, bifurcations. Mathematically determined chaos. Feigenbaum diagram, Lorenz section, Poincaré section. Fractality, fractal structures. Recurrence maps. Mandelbrot set and Julia sets. Multibrot sets and nonlinear dynamical systems. Fractal dimensions. Universal route to chaos. Identification of chaotic processes. Analytical and numerical methods, Lyapunov exponent. Entropy. Horizon of predictability. Examples from physics, mechanics, biology and ecology. Applications of chaos theory and fractal geometry.

Address TalTech Campus, Ehitajate Rd. 5, 19086 Tallinn, Estonia
Employer Andrus Salupere, PhD, Director of Department of Cybernetics

2012–2013 **Teaching assistant (Nonlinear Dynamics, course code in TalTech curriculum: EMR 0060)**, *Institute of Cybernetics*, Tallinn University of Technology.

Responsibilities Preparation and evaluation of home assignments. Evaluating and assessing students' progress. Instructing students on proper use of equipment, materials, aids and textbooks.

Address Akadeemia Rd. 21B, 12618 Tallinn, Estonia

Employer Jüri Engelbrecht, DSc. (Vice-President of Estonian Academy of Sciences, Head of Department of Institute of Cybernetics at TalTech)

2008–2013 **Lecture: Fractal geometry of human composed music and basics of algorithmic music**, *Under the Tallinn University of Technology course Nonlinear Dynamics (collaboration with Academic/Professor Jüri Engelbrecht, D.Sc)*, Course code in TalTech curriculum: EMR 0060.

Talking points The fractal geometry of human composed music. History of fractal and algorithmic music composition. Overview of concepts used in fractal music composition. Self-similar series, sets, sequences and fractals that are used for the fractal music composition.

PhD thesis supervisions

2022–present **TBA**, by *Maria Miranda Vuin*, supervisor: *D. Kartofelev*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on TBA.

Responsibilities Organising the thesis work. Aiding student in following tasks: finding relevant literature; preparation and execution of experimental work; analysing the data gathered from the experiments; creation of physical models based on the previously established hypotheses and assumptions. Aiding with publishing and presenting of the obtained scientific results.

2023–present **TBA**, by *Päivo Simson*, supervisor: *D. Kartofelev*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on TBA.

Responsibilities See previous entry.

PhD thesis co-supervisions

2020–present **TBA**, by *Marek Vilipuu*, supervisors: *J. Kalda*, *D. Kartofelev*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on TBA.

Responsibilities See previous entry.

MSc thesis supervisions

2017–2019 **Dispersive wave propagation on a nylon guitar string**, by *Joann G. Arro*, supervisors: *D. Kartofelev*, *V. Välimäki*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on Jun. 6, 2019.

Responsibilities Organising the thesis work. Aiding student in following tasks: finding relevant literature; preparation and execution of experimental work; analysing the data gathered from the experiments; creation of physical models based on the previously established hypotheses and assumptions.

MSc thesis co-supervisions

2012–2014 **Magnetic pickup nonlinearity**, by *Mirko Mustonen*, supervisors: *A. Stulov, V. Välimäki, D. Kartofelev*, Tallinn University of Technology, Institute of Cybernetics and Aalto University, Department of Signal Processing and Acoustics (Finland), Thesis defended on Jun. 13, 2014.

Responsibilities See previous entry and additionally practical organisation of the international collaboration.

BSc thesis supervisions

2021–2022 **Logistiline kujutis meloodia generaatorina, (Logistic map as a melody generator)**, by *Liisi Raudväli*, supervisor: *D. Kartofelev*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on Jun. 8, 2022.

Responsibilities Organising the thesis work. Aiding student in following tasks: finding relevant literature; preparation and execution of experimental work; analysing the data gathered from the experiments; creation of physical models based on the previously established hypotheses and assumptions.

Feb.–Jun. 2017 **Võnkuva keele ja jäiga barjääri interaktsiooni kinemaatika, (Kinematic interaction of a vibrating string and a rigid obstacle)**, by *Vadislav Ogorodnik*, supervisor: *D. Kartofelev*, Tallinn University of Technology, School of Science, Department of Cybernetics, Thesis defended on Jun. 8, 2017.

Responsibilities See previous entry.

BSc thesis co-supervisions

Jan.–Jun. 2012 **Bass guitar sound modelling based on experimental data**, by *Mirko Mustonen*, supervisors: *A. Stulov, D. Kartofelev*, Tallinn University of Technology, Institute of Physics, Thesis defended on Jun. 12, 2012.

Responsibilities See previous entry.

Organisational work

Dec. 9–10, 2014 **Member of organisation committee**, *Autumn Workshop of Institute of Cybernetics 2014*, Jämeda, Estonia.

2012–2014 Organisation and co-supervision of international MSc thesis (collaboration between Tallinn University of Technology and Aalto University).

2012–present I have organised and aided undergraduate students in their thesis work and in their preparation for the thesis defence, see above.

Scientific research

2007–present **Musical acoustics, nonlinear wave propagation, mathematical physics.**
Classification in the common European research classification scheme (CERCS): P190

Research topics I have been involved with:

- String instrument acoustics (lutes, grand piano).
- Grand piano hammer–string interaction dynamics.
- Physical properties of piano hammer felt. Wave propagation through felt-type composite materials.
- Fundamentals of chaos theory and nonlinear dynamical systems.
- Fractal geometry and power laws in human composed music.

Pro bono work and activism

2012–2015 **Advisor to Marita Lumi the inventor and constructor of the *saia do harpa* (harp skirt)**, *Problems related to the selection of the string parameters (mensuration) and the string termination conditions.*

Saia do harpa a string instrument that combines a harp with a cone shaped soundboard. Entire instrument can be worn as an adornment and played by one or several performers (plucking, bowing, striking by mallets, etc.).

Marita Lumi Estonian inventor, designer and jewellery artist.

Command of languages

Estonian Fluent

My native language. Fluent in speech, good in writing and reading

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|---------|--------------|--|
| Russian | Fluent | <i>My native language. Fluent in speech, intermediate in writing and reading</i> |
| English | Very good | <i>Very good in speech, very good in reading and writing</i> |
| Finnish | Intermediate | <i>Good in speech, intermediate in reading and writing</i> |

Computer skills

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|------------|--|-------------|--|
| OS | UNIX (Mac OS X), Linux (Ubuntu), MS Windows (Windows 10) | Programming | Python, Fortran (scientific computing, data manipulation and analysis) |
| Software | Wolfram Mathematica, MS Excel, Adobe Photoshop, Inkscape | Packages | NumPy, SciPy, SymPy, Matplotlib (Python packages) |
| Typography | L ^A T _E X, MS Word, LibreOffice Writer | Other | HTML |

Social skills and competences

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| Team work | Considered to be a valuable team member. |
| Multilingualism | I have worked in multilingual and multicultural environments. Have experience in working abroad. |

Publications

Refereed articles (7 publications)

- 2023 **[submitted] TBA**, *D. Kartofelev, M. Vilipuu, R. M. Palmiste, J. Kalda*, European Journal of Physics, vol. xx, no. xx, pp. xx–xx.
DOI: TBA
- 2020 **A case study on the spatial variability of strength in a SFRSCC slab and its correlation with fiber orientation**, *D. Kartofelev, O. Goidyk, H. Herrmann*, Proceedings of the Estonian Academy of Sciences, vol. 69, no. 4, pp. 298–310.
DOI: 10.3176/proc.2020.4.03
- 2017 **Negative group velocity in solids**, *K. Tamm, T. Peets, J. Engelbrecht, D. Kartofelev*, Wave Motion, vol. 71, pp. 127–138.
DOI: 10.1016/j.wavemoti.2016.04.010
- 2015 **Wave propagation and dispersion in microstructured wool felt**, *D. Kartofelev, A. Stulov*, Wave Motion, vol. 57, pp. 23–33.
DOI: 10.1016/j.wavemoti.2015.03.002
- 2014 **Propagation of deformation waves in wool felt**, *D. Kartofelev, A. Stulov*, Acta Mechanica, vol. 225, no. 11, pp. 3103–3113.
DOI: 10.1007/s00707-014-1109-1
- Vibration of strings with nonlinear supports**, *A. Stulov, D. Kartofelev*, Applied Acoustics vol. 76, pp. 223–229.
DOI: 10.1016/j.apacoust.2013.08.010
- 2013 **Waves in microstructured solids and negative group velocity**, *T. Peets, D. Kartofelev, K. Tamm, J. Engelbrecht*, EPL - A Letters Journal Exploring the Frontiers of Physics, vol. 103, no. 1, pp. 16001-p1–16001-p6.
DOI: 10.1209/0295-5075/103/16001

Articles in conference proceedings (15 publications)

- 2020 **Insights into the string–barrier interaction dynamics based on high-speed camera measurements**, *D. Kartofelev, Joann G. Arro, Vesa Välimäki*, in Proc. 17th Sound and Music Computing Conference (SMC 2020), Jun. 24–26, 2020, Turin, Italy, pp. 169–176.
- 2019 **Experimental verification of dispersive wave propagation on guitar strings**, *D. Kartofelev, Joann G. Arro, Vesa Välimäki*, in Proc. 16th Sound and Music Computing Conference (SMC 2019), May. 28–31, 2019, Málaga, Spain, pp. 324–331.
- 2017 **Kinematics of ideal string vibration against a rigid obstacle**, *D. Kartofelev*, in Proc. 20th International Conference on Digital Audio Effects (DAFx-17), Sep. 5–9, 2017, Edinburgh, Scotland, United Kingdom, pp. 40–47.

- 2016 **Frequency-dependent dissipation in dispersive wool felt**, *D. Kartofelev, K. Tamm, T. Peets*, in Proc. 22nd International Congress on Acoustics ICA 2016, Sep. 5–9, 2016, Buenos Aires, Argentina, pp. [1–10].
- 2015 **Nonlinear pulse propagation in microstructured materials in case of the negative group velocity**, *K. Tamm, T. Peets, D. Kartofelev*, in Proc. 3rd ECCOMAS Young Investigators Conference YIC2015, Jul. 20–23, 2015, Aachen, Germany, pp. [1–4].
- Pitch glide effect induced by a nonlinear string–barrier interaction**, *D. Kartofelev, A. Stulov, V. Välimäki*, in Proc. 20th International Symposium on Nonlinear Acoustics ISNA 2015, Jun. 29–Jul. 3, 2015, Écully, France, pp. 030004-1–030004-4.
DOI: 10.1063/1.4934387
- 2014 **Wave propagation and attenuation in wool felt**, *D. Kartofelev, A. Stulov*, in Proc. 7th Forum Acusticum 2014, Sep. 7–12, 2014, Kraków, Poland, pp. [1–6].
- Application of high-speed line scan camera for acoustic measurements of vibrating objects**, *M. Mustonen, D. Kartofelev, A. Stulov, V. Välimäki*, in Proc. 7th Forum Acusticum 2014, Sep. 7–12, 2014, Kraków, Poland, pp. [1–6].
- Application of high-speed line scan camera for string vibration measurements**, *D. Kartofelev, M. Mustonen, A. Stulov, V. Välimäki*, in Proc. International Symposium on Musical Acoustics ISMA 2014, Jul. 7–12, 2014, Le Mans, France, pp. [1–5].
- Experimental verification of pickup nonlinearity**, *M. Mustonen, D. Kartofelev, A. Stulov, V. Välimäki*, in Proc. International Symposium on Musical Acoustics ISMA 2014, Jul. 7–12, 2014, Le Mans, France, pp. [1–5].
- High-speed line-camera measurements of a vibrating string**, *M. Pàmies-Vilà, I. A. Kubilay, D. Kartofelev, M. Mustonen, A. Stulov, V. Välimäki*, in Proc. Baltic-Nordic Acoustic Meeting BNAM 2014, Jun. 2–4, 2014, Tallinn, Estonia, pp. [1–8].
- 2013 **Modeling a vibrating string terminated against a bridge with arbitrary geometry**, *D. Kartofelev, A. Stulov, H.-M. Lehtonen, V. Välimäki*, in Proc. SMAC 2013, 4th Stockholm Music Acoustics Conference: (Editors) R. Bresin, A. Askenfelt. KTH Royal Institute of Technology, Jul. 30–August 3, 2013, Stockholm, Sweden, pp. 626–632.
- 2010 **Influence of the edge of the cast iron frame curvature on the spectrum of the piano string vibration**, *D. Kartofelev, A. Stulov*, in Proc. Second Vienna Talk on Music Acoustics "Bridging the Gaps", Sep. 19–21, 2010, Vienna, Austria, pp. 85–88.
- 2009 **Piano hammer–string interaction: The influence of the elastic parameters of bass hammers on the contact time duration**, *D. Kartofelev, A. Stulov*, in Proc. ACOUSTICS High Tatras 2009: 34th International Acoustical Conference - EAA Symposium, September 28–30, 2009, Nový Smokovec, Slovakia, pp. [1–4].
- 2008 **Vibration of the string with nonlinear contact condition**, *D. Kartofelev, A. Stulov*, Nonlinear Acoustics - Fundamentals and Applications: 18th International Symposium on Nonlinear Acoustics (ISNA 18) Jul. 7–10, 2008, Stockholm, Sweden: (Editors) Enflo, B.O.; Hedberg, C.M.; Kari, L. Melville, NY: American Institute of Physics, 2008, (AIP Conference Proceedings; 1022), pp. 621–624.
- [Abstracts \(7 publications\)](#)
- 2023 **On pulse propagation in porous visco-elastic felt-like material**, *D. Kartofelev, M. M. Vuin*, In Book of Abstracts: SAPEM 23, Symposium on the Acoustics of Poro-Elastic Materials, November 7–10, 2023, Sorrento, Italy, (Editor) xx, pp. [1–2].
- Strain wave propagation through felt**, *M. M. Vuin, D. Kartofelev, A. Salupere*, In Book of Abstracts: SAPEM 23, Symposium on the Acoustics of Poro-Elastic Materials, November 7–10, 2023, Sorrento, Italy, (Editor) xx, pp. [1–2].
- 2015 **Boussinesq paradigm and negative group velocity in a material with double microstructure**, *K. Tamm, T. Peets, D. Kartofelev*, In Book of Abstracts: The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, April 1–4, 2015, Athens, Georgia, USA, (Editors) G. Biondini, T. Taha, p. 29.

2013 **Algorithmic melody composition based on fractal geometry of music**, *D. Kartofelev, J. Engelbrecht*, In Book of Abstracts: FUDoM 13 Finno-Ugric International Conference On Mechanics, August 11–15, 2013, Ráckeve, Hungary, (Editor) B. Fekete, p. 28.

Negative group velocity may appear in microstructured solids, *J. Engelbrecht, T. Peets, D. Kartofelev*, In Book of Abstracts: FUDoM 13 Finno-Ugric International Conference On Mechanics, August 11–15, 2013, Ráckeve, Hungary, (Editor) B. Fekete, pp. 46–47.

2011 **Acoustical properties of the wool felt**, *A. Stulov, D. Kartofelev*, In Book of Abstracts: SAPEM 2011: Symposium on the Acoustics of Poro-Elastic Materials, December 14–16, 2011 Ferrara, Italy, p. [1].

2009 **Propagation of deformation waves in the piano hammer felt**, *D. Kartofelev, A. Stulov*, International Conference on Complexity of Nonlinear Waves: Book of Abstracts, October 5–7, 2009, Tallinn, Estonia: (Editors) A. Berezovski, T. Soomere. Tallinn: Tallinn University of Technology, 2009, p. 36.

Research reports (4 publications)

2015 **Practical notes on selected numerical methods with examples**, *K. Tamm, M. Lints, D. Kartofelev, P. Simson, M. Ratas, P. Peterson*, Research Report Mech 312/15, pp. [1–33].

2013 **Wave propagation and dispersion in microstructured wool felt**, *A. Stulov, D. Kartofelev*, Research Report Mech 307/13, pp. [1–13].

Experimental measurements of string motion, *M. Mustonen, D. Kartofelev, A. Stulov*, Research Report Mech 306/13, pp. [1–11].

2008 **Modeling of the string with nonlinear contact conditions**, *A. Stulov, D. Kartofelev*, Research Report Mech 292/08, pp. [1–10].

Chapter in a book (1 publication)

2015 **Klaverikeelte keerukas võnkumine: Haamer. Keele võnkumise mõõtmine. Hüsterees**, *D. Kartofelev*, (Editors) J. Engelbrecht, T. Kändler, Keeruka maailma võlu, ISBN 978-9949-430-90-1, pp. 39–41.

Lecture notes (3 publication)

2019–present **Sissejuhatus programmeerimisse Pythoni baasil, YFX0500**, *D. Kartofelev*, <https://www.tud.ttu.ee/web/dmitri.kartofelev/python.html>.

2018–present **Nonlinear dynamics, YFX1520**, *D. Kartofelev*, <https://www.tud.ttu.ee/web/dmitri.kartofelev/YFX1520.html>.

2013 **Fractality in music**, *D. Kartofelev, J. Engelbrecht*, Lecture Notes Mech 10/2013, pp. [1–28].

Theses (3 publications)

PhD thesis **Nonlinear Sound Generation Mechanisms in Musical Acoustics**, *Institute of Cybernetics, Laboratory of Nonlinear Dynamics, Department of Science*, Tallinn University of Technology Press, 2014, ISBN 978-9949-23-660-2, Supervisor: A. Stulov, PhD.

MSc thesis **Analysis of Vibration Spectra of Piano String**, *Institute of Cybernetics*, Tallinn University of Technology, Supervisor: A. Stulov, PhD.

BSc thesis **Action of Traveling Wave on a Piano Bridge**, *Institute of Physics, Department of Science*, Tallinn University of Technology, Supervisor: A. Stulov, PhD.

Science popularisation videos (4 publications)

Sep. 20, 2022 **Video sarjast Juulius Tipikas ütlus: Viskoosne vedelik ja metallist kuulike**, *D. Kartofelev, M. Vilipuu*, <https://www.youtube.com/watch?v=IM4oaKB7I0I>.

Video sarjast Juulius Tipikas ütlus: Ballistiline trajektoor, *D. Kartofelev, M. Vilipuu*, <https://www.youtube.com/watch?v=ZHwyx0ESocI>.

Video sarjast Juulius Tipikas ütlus: Elastne pörge ja kaos, *D. Kartofelev*, <https://www.youtube.com/watch?v=-ywV717-BqE>.

Video sarjast Juulius Tipikas ütlis: Magnetiline kaootiline pendel, D. Kartofelev, https://www.youtube.com/watch?v=_daQ-eIkpsI.

Bibliometrics

Scopus **Scopus Author ID: 24528888600, *h-index* 4.**
ResearcherID **ResearcherID ID: H-6639-2018, *h-index* 4.**
Google Scholar **Google Scholar user: BBBKcrMAAAAJ, *h-index* 7.**
ORCID **ORCID ID: 0000-0002-9334-7542.**

Scientific conference presentations

International (oral presentations)

- Nov. 7–10, 2023 **On pulse propagation in porous visco-elastic felt-like material, D. Kartofelev, M. M. Vuin,** Symposium on the Acoustics of Poro-Elastic Materials (SAPEM 23), Sorrento, Italy.
Strain wave propagation through felt, M. M. Vuin, D. Kartofelev, A. Salupere, Symposium on the Acoustics of Poro-Elastic Materials (SAPEM 23), Sorrento, Italy.
- Jul. 4–8, 2022 **String collision and sliding against a smooth obstacle in a non-planar vibration setting, D. Kartofelev,** 22nd International Symposium on Nonlinear Acoustics (ISNA 2022), Oxford, England, UK.
Use of simplified bowed string model in physics education: A laboratory experiment, M. Vilipuu, D. Kartofelev, 22nd International Symposium on Nonlinear Acoustics (ISNA 2022), Oxford, England, UK.
- Jun. 24–26, 2020 **Insights into the string–barrier interaction dynamics based on high-speed camera measurements, D. Kartofelev, Joann G. Arro, Vesa Välimäki,** 17th Sound and Music Computing Conference (SMC 2020), Turin, Italy.
- May. 28–31, 2019 **Experimental verification of dispersive wave propagation on guitar strings, D. Kartofelev, Joann G. Arro, V. Välimäki,** 16th Sound and Music Computing Conference (SMC 2019), Málaga, Spain.
- Sep. 5–9, 2016 **Frequency-dependent dissipation in dispersive wool felt, D. Kartofelev, K. Tamm, T. Peets,** 22nd International Congress on Acoustics ICA 2016, Buenos Aires, Argentina.
- Jun. 29–Jul. 3, 2015 **Pitch glide effect induced by a nonlinear string–barrier interaction, D. Kartofelev, A. Stulov, V. Välimäki,** The 20th International Symposium on Nonlinear Acoustics including the 2nd International Sonic Boom Forum, Écully, France.
- Sep. 7–12, 2014 **Wave propagation and attenuation in wool felt, D. Kartofelev, A. Stulov,** 7th Forum Acusticum 2014, Kraków, Poland.
Application of high-speed line scan camera for acoustic measurements of vibrating objects, M. Mustonen, D. Kartofelev, A. Stulov, V. Välimäki, 7th Forum Acusticum 2014, Kraków, Poland.
- Jul. 7–12, 2014 **Application of high-speed line scan camera for string vibration measurements, D. Kartofelev, M. Mustonen, A. Stulov, V. Välimäki,** International Symposium on Musical Acoustics ISMA 2014, Le Mans, France.
Experimental verification of pickup nonlinearity, M. Mustonen, D. Kartofelev, A. Stulov, V. Välimäki, International Symposium on Musical Acoustics ISMA 2014, Le Mans, France.
- Aug. 11–15, 2013 **Algorithmic melody composition based on fractal geometry of music, D. Kartofelev, J. Engelbrecht,** FUDoM 13 Finno-Ugric International Conference on Mechanics, Ráckeve, Hungary.
Negative group velocity may appear in microstructured solids, J. Engelbrecht, T. Peets, D. Kartofelev, FUDoM 13 Finno-Ugric International Conference on Mechanics, Ráckeve, Hungary.
- Jul. 30–Aug. 3, 2013 **Modeling a vibrating string terminated against a bridge with arbitrary geometry, D. Kartofelev, A. Stulov, H.-M. Lehtonen, V. Välimäki,** SMAC Stockholm Music Acoustics Conference 2013/SMC Sound and Music Computing Conference 2013, Stockholm, Sweden.

- Dec. 14–16, 2011 **Acoustical properties of the wool felt**, *D. Kartofelev, A. Stulov*, Symposium on the Acoustics of Poro-Elastic Materials (SAPEM 2011), Ferrara, Italy.
- Oct. 5–7, 2009 **Propagation of deformation wave in the piano hammer felt material**, *D. Kartofelev, A. Stulov*, International Conference on Complexity of Nonlinear Waves, Tallinn, Estonia.
- Sep. 28–30, 2009 **Piano hammer–string interaction: The influence of the elastic parameters of bass hammer on contact time duration**, *D. Kartofelev, A. Stulov*, ACOUSTICS High Tatras 2009, 34th International Acoustical Conference - EAA Symposium, Nový Smokovec, High Tatras, Slovakia.
- Jul. 7–10, 2008 **Vibration of the string with nonlinear contact condition**, *D. Kartofelev, A. Stulov*, 18th International Symposium on Nonlinear Acoustics, Stockholm, Sweden.
- [International \(poster presentations\)](#)
- Sep. 5–9, 2017 **"Kinematics of ideal string vibration against a rigid obstacle"**, *D. Kartofelev*, The 20th International Conference on Digital Audio Effects (DAFx-17), Edinburgh, Scotland, United Kingdom.
- Sep. 19–21, 2010 **Influence of the edge of the cast iron frame curvature on the spectrum of the piano string vibration**, *D. Kartofelev, A. Stulov*, 2nd ViennaTalk on Music Acoustics, Vienna, Austria.
- [Other \(oral presentations\)](#)
- Oct. 28–29, 2022 **Elastse keele võnkumine, pörkumine ja hõõrdumine vastu statsionaarse barjääri pinda (Collision and friction of elastic string against stationary barrier)**, *D. Kartofelev*, LI Eesti füüsikapäevad 2022 (51th Estonian Days of Physics 2022), Nelijärve, Harju county, Estonia.
- Aug. 16–18, 2022 **Logistiline kujutis ja selle kasutamine muusika genereerimisel (Logistic map and its use for music generation)**, *D. Kartofelev, Liisi Raudväli*, XVIII matemaatika päevad 2022 (18th Days of Mathematics 2022), Voore, Jõgeva county, Estonia.
- Dec. 9–10, 2014 **Kymographic imaging of vibrating strings**, *D. Kartofelev, A. Stulov, V. Välimäki*, TTÜ Küberneetika Instituudi Sügisseminar 2014 (Autumn Workshop of Institute of Cybernetics 2014), Jäneda, Estonia.
- Nov. 29–30, 2013 **How is sound of musical instruments influenced by small structural imperfections?**, *D. Kartofelev, A. Stulov*, TTÜ Küberneetika Instituudi Sügisseminar 2013 (Autumn Workshop of Institute of Cybernetics 2013), Elbiku, Läänemaa, Estonia.
- Nov. 9–10, 2012 **Musical instruments and nonlinearly supported strings**, *D. Kartofelev, A. Stulov*, TTÜ Küberneetika Instituudi Sügisseminar 2012 (Institute of Cybernetics Workshop 2012), Laulasmaa, Estonia.
- Nov. 12–13, 2011 **Deformation wave propagation in wool felt**, *D. Kartofelev, A. Stulov*, TTÜ Küberneetika Instituudi Sügisseminar 2011 (Autumn Workshop of Institute of Cybernetics 2011), Viinistu, Estonia.
- Oct. 17–18, 2009 **The influence of the elastic parameters of piano bass hammers on the hammer–string contact time duration**, *D. Kartofelev, A. Stulov*, TTÜ Küberneetika Instituudi Sügisseminar 2009 (Autumn Workshop of Institute of Cybernetics 2009), Viinistu, Estonia.
- Sep. 15–16, 2008 **Klaverihaamri löögist tekitatud keele võnkumised**, *D. Kartofelev, A. Stulov*, XIII Eesti Mehaanikapäevad (13th Estonian Days of Mechanics), Tallinn, Estonia.

Scientific conference visits

- Nov. 30, 2017 **10th Conference of School of Science**, *Tallinn University of Technology*, Tallinn, Estonia.
- Nov. 12, 2015 **8th Conference of School of Science**, *Tallinn University of Technology, Innovation and Business Centre Mektory*, Tallinn, Estonia.
- Oct. 22–23, 2015 **28th Nordic Seminar on Computational Mechanics**, Tallinn, Estonia.
- Jun. 2–4, 2014 **Baltic-Nordic Acoustic Meeting 2014, (BNAM 2014)**, Tallinn, Estonia.

Honours and awards

Aug. 15, 2013 **Student paper competition at the FUDoM 2013 conference**, *shared a first prize in the PhD student category*, Diploma issued by Budapest University of Technology and Economics and Hungarian Academy of Sciences.

Funding and scholarships

Personal and group funding (research grants)

2021–2025 **Estonian Ministry of Education and Research, Project PRG1227**, *Modelling of nonlinear wave processes in advanced materials*, PI: A. Salupere, Institute of Cybernetics, TalTech.

Role in the project Researcher.

2016–2019 **Estonian Ministry of Education and Research, Project PUT1146**, *Rheology of short fibre reinforced cementitious composites and influence on fracture behaviour*, PI: H. Herrmann, Institute of Cybernetics at TalTech.

Role in the project Assistant researcher, theoretical aspects of constitutive relations of fibre reinforced cementitious composites.

Institutional funding

2015–2020 **Estonian Ministry of Education and Research, Project IUT33-24**, *Wave propagation in complex media and applications*, PI: A. Salupere, Institute of Cybernetics at TalTech.

Role in the project Researcher, nonlinear wave propagation in piano hammer wool felt.

2011–2015 **EU through European Regional Development Fund, Archimedes Foundation, Project TK124 (CENS)**, *Centre for Nonlinear Studies*, PI: J. Engelbrecht, Institute of Cybernetics at TalTech and Faculty of Science and Technology, Institute of Physics, University of Tartu.

Role in the project Researcher, applied mechanics and nonlinear phenomena in musical acoustics.

2012 **Aalto University funding scheme for infrastructure**, *Scientific laboratory equipment*, PI: V. Välimäki, Aalto University, School of Electrical Engineering, Department of Signal Processing and Acoustics.

Role in the project Visiting researcher, experimental musical acoustics.

2008–2013 **Estonian Ministry of Education and Research, Project SF0140077s08**, *Nonlinear dynamics and complex systems*, PI: J. Engelbrecht, Institute of Cybernetics at TalTech.

Role in the project Researcher, nonlinear phenomena in musical acoustics.

HARNO, IT Academy programs

2021–2022 **Haridus- ja Noorteameti (HARNO) ja IT akadeemia e-õppe arendusprojekt, EITSA21097**, *Füüsika-alaste digipädevuste arendamine ja e-õppevara loomine täppisteadustes*, PI: J. Raud.

Role in the project Project team member representing Taltech.

HITSA, IT Academy programs

2020 **HITSA Information Technology Foundation for Education, EITSA20007**, *Erialaste digipädevuste arendamine ja e-õppevara loomine täppisteadustes*, PI: R. Kangro.

Role in the project Project team member representing TalTech.

Erasmus+ program (science mobility grant)

Jun. 2019 **Erasmus+, Staff intra-EU mobility through Erasmus+ programme, European Commission**, *mobility/secondment expenses (Aalto University, Espoo, Finland)*.

Jan. 2018 **Erasmus+, Staff intra-EU mobility through Erasmus+ programme, European Commission**, *mobility/secondment expenses (Aalto University, Espoo, Finland)*.

Kristjan Jaak scholarships

Aug. 2014 **Kristjan Jaak scholarship, Archimedes Foundation**, *conference visit expenses (Kraków, Poland)*.

Dec. 2012 **Kristjan Jaak scholarship, Archimedes Foundation**, *part-time study and scientific work abroad (Jan.–Jun. 2013; Helsinki, Finland)*.

Aug. 2010 **Kristjan Jaak scholarship, Archimedes Foundation**, *conference visit expenses (Vienna, Austria)*.

Jul. 2008 **Kristjan Jaak scholarship, Archimedes Foundation**, *conference visit expenses (Stockholm, Sweden)*.

Doctoral Studies and Internationalisation Programme DoRa (travel grants)

- Apr. 2019 **DoRa Plus Action 1.1, Archimedes Foundation**, *mobility/secondment expenses (Málaga, Spain)*.
- Oct. 2018 **DoRa Plus Action 1.1, Archimedes Foundation**, *mobility/secondment expenses (Espoo, Finland)*.
- Jul. 2017 **DoRa Plus Action 1.1, Archimedes Foundation**, *conference visit expenses (Edinburgh, Scotland, UK)*.
- Jun. 2016 **DoRa Plus Action 1.1, Archimedes Foundation**, *conference visit expenses (Buenos Aires, Argentina)*.
- May 2015 **DoRa Action 8, Archimedes Foundation**, *conference visit expenses (Écully, France)*.
- Jun. 2014 **DoRa Action 8, Archimedes Foundation**, *conference visit expenses (Le Mans, France)*.
- Jun. 2013 **DoRa Action 8, Archimedes Foundation**, *conference visit expenses (Stockholm, Sweden)*.
- Dec. 2011 **DoRa Action 8, Archimedes Foundation**, *conference visit expenses (Ferrara, Italy)*.
- Oct. 2009 **DoRa Action 8, Archimedes Foundation**, *conference visit expenses (Nový Smokovec, High Tatras, Slovakia)*.

Interests, hobbies and pastime

Topics of interest

- Epistemology** The branch of philosophy concerned with the nature and scope of knowledge.
- Critical thinking** is thinking that questions assumptions. It is a way of deciding whether a claim is always true, sometimes true, partly true, or false. In practise critical thinking clarifies goals, examines assumptions, discerns hidden values, evaluates evidence, accomplishes actions, and assesses conclusions.
- Scepticism** *Philosophical scepticism* — scepticism is generally any questioning attitude towards knowledge, facts, or opinions/beliefs stated as facts, or doubt regarding claims that are taken for granted elsewhere. Philosophical scepticism is an overall approach that requires all information to be well supported by evidence.
- Scientific scepticism* — also known as rational scepticism or sceptical inquiry is the practice of questioning whether claims are supported by empirical research or evidence and have reproducibility, as part of a methodological norm pursuing the extension of *certified knowledge*.
- Morality** Morality (descriptive and normative) is the differentiation of intentions, decisions, and actions between those that are more *good* (or right) and those that are more *bad* (or wrong, immoral). I'm especially interested in the evolution or the emergence of morality (evolutionary sociobiology).
- Ethics** Ethics (descriptive and normative) as the philosophy of morality. Ethics studies the moral behaviour in humans. It seeks to resolve questions dealing with human morality.
- Lucid dreaming** A lucid dream is a dream in which one, for an uninterrupted and prolonged amount of time, is aware that one is dreaming.

Hobby activities

- Home-brewing** Brewing wine, cider and beer at home.
- Handicraft** Robust wood carving, baskets weaving using metal wires.

Sports

Weight training and jogging.

Pastime

- YouTube** Watching YouTube (<https://www.youtube.com>) videos created by amateur YouTube users.
- Movies** Watching movies.
- TV** Watching various television programs and shows.

References

Persons who are familiar with my professional qualifications and character

2007–2016 **Anatoli Stulov, PhD**, *Senior researcher, My PhD and MSc thesis supervisor*, Institute of Cybernetics at Tallinn University of Technology.

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Jan.–Jun. 2013 **Vesa Välimäki, PhD**, *Professor of audio signal processing*, Aalto University, School of Electrical Engineering, Department of Signal Processing and Acoustics.

Phone (+358) 9 470 25749

E-mail vesa.valimaki@aalto.fi

Fax (+358) 9 460 224

Address P.O. Box 13000 FI-00076 AALTO, Espoo, Finland

2009–present **Andrus Salupere, PhD**, *Professor. Director of Department of Cybernetics at School of Science, Tallinn University of Technology, Chair of Applied Mechanics at Tallinn University of Technology.*

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