

Curriculum Vitae of Andrey I. Korolkov

Research associate at the Mathematical Department of the University of Manchester

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Degrees

- 2016 Candidate of Sciences (equiv. to Ph. D. degree), Moscow State University,
Title: “New solutions to two-dimensional problems of acoustic waves diffraction by periodic gratings consisting of absorbing screens and by an impedance strip”
- 2012 Diploma in Physics (theoretical physics) (equiv. to M. Sc. degree) Moscow State University

Employment history

- 2023-now Research associate at the Mathematical Department of the University of Manchester
- 2025-now Consultancy for the School of Electronics & Computer Science at the University of Southampton (part-time, short-term contract)
- 2022-2023 Leading engineer at the Media Algorithm Laboratory, Moscow Research Centre – Huawei Technologies (part-time occupation)
- 2016-2023 Leading Specialist at the Department of Physics, Moscow State University
- 2017-2022 Researcher in A. M. Prokhorov General Physics Institute of the Russian Academy of Sciences (part-time occupation)

Research interests

Diffraction theory:

canonical diffraction problems, Wiener-Hopf method, discrete diffraction problems, Sommerfeld-type integrals, waveguide theory, transient wave phenomena, parabolic equation of diffraction theory, anomalous transmission and reflection

Acoustics:

diffraction experiment in acoustics, impedance tube measurements, medical acoustics, lumped element modelling, metamaterials

Numerical modeling

development of FEM software, numerical evaluation of oscillating integrals

Teaching experience

Reading mini-course on FEM modelling

Supervision of M. Sc. and Ph. D. students

Supervision of group student projects (foundation year, 2024)

Supervision classes on vector calculus and probability, year 1 (2024)

Outreach teaching

Summer camps on mathematics and physics for high school students

Academic funding (investigator)

- 2018 -2020 “Acoustics of the circulatory system: features of signal generation for disorders of hemodynamics of the small circulation, noninvasive diagnosis of pulmonary hypertension and pathology of the vascular bed”, RFBR grant
- 2014-2018 “New acoustic effects with applications to materials sciences, diagnostics and signal processing”, RSCF grant
- 2014-2016 “Development of new experimental and theoretical methods of studying of sound fields and application of these methods to the problems of room acoustics”, RFBR grant
- 2015 “Experimental modelling of a passenger aircraft noise screening”,
contract with TSaGI (Central Aero- and Hydro- Mechanical Institute,
Moscow),

(RFBR is the Russian Fund for Basic Research, and RSCF is the Russian Scientific Foundation. Their grants cover travel expenses, equipment and salaries on the level of part-time occupation.)

Industrial funding (investigator)

- 2012 - 2022 Michelin, Research in tire noise
- 2019 – 2021 Huawei, Modelling and design of earphones
- 2015 - 2016 StGobain, Design of sound-absorbing metamaterials

Academic awards

- 2024 Finalist for the UKAN+ mathematical and computational acoustics paper prize
- 2022 Award of Development program of Moscow State University
- 2017 Award of Development program of Moscow State University
- 2016 Competition for young scientists of the department of Physics of Moscow State University
- 2015 Acoustical Society of America international student grant

Lead organisational roles in professional conferences

- 2025 co-organizing a mini-symposium on "Analytical methods in wave phenomena" at BAMC 2025 in Exeter, UK
- 2024 co-organizing a mini-symposium on "Acoustic and elastic wave scattering" " at BAMC 2024 in Newcastle, UK

Invited talks

- 2024 Cross-Fertilisation of ideas from the Riemann–Hilbert Technique and the Wiener–Hopf Method, BIRS, Hangzhou
- 2024 “WHT Follow on: the applications, generalization and implementation of the Wiener-Hopf Method”, INI, Cambridge
- 2024 “Singular and oscillatory integration: advances and applications”, UCL, London
- 2022 “Multimodal AI Workshop”, St. Petersburg, Russia
- 2022 “Workshop on Acoustics”, ITMO, St. Petersburg, Russia
- 2020 “Waves in Complex Continua (Wavinar)”, ICMS online seminar
- 2017 “Special Session ICEAA on Recent Developments in the Parabolic Equation Methods”, Verona, Italy
- 2016 “Seminar on Wave Diffraction and Propagation” St. Petersburg, Russia
- 2015 “Waveguides: asymptotic methods and numerical analysis” workshop, Naples, Italy

Number of publications

Articles in peer-reviewed journals – 33

Selected publications

1. **A. I. Korolkov**, R. C. Assier, A.V. Kisil. On an analogy between the Wiener–Hopf formulations of discrete and continuous diffraction problems, Submitted to IMA J. Appl. Math., 2025

2. **A. I. Korolkov**, A. V. Kisil. The Wiener–Hopf perspective on embedding formula: reusing solutions of boundary value problems. *R. Soc. Open Sci.* **12**241782, 2025
3. R. C. Assier, A. V. Shanin, **A. I. Korolkov**. A contribution to the mathematical theory of diffraction. Part II: Recovering the far-field asymptotics of the quarter-plane problem. *Quart. Appl. Math.*, 77(1-2), 2024
4. A. V. Shanin, R. C. Assier, **A. I. Korolkov**, O. I. Makarov. Double Floquet-Bloch transforms and the far-field asymptotics of Green's functions tailored to periodic structures. *Physical Review B*, 110(2), 024310, 2024
5. K. S. Kniazeva, Y. Saito, **A. I. Korolkov**, A. V. Shanin. Saddle Point Method Interpretation of Transient Processes in Car Tires. *Supercomputing Frontiers and Innovations*, 10(1), 31-45, 2023
6. **A. I. Korolkov**, K. S. Kniazeva, and A. S. Shurup. Acoustic location based on triple correlation. *Bulletin of the Russian Academy of Sciences: Physics*, 86(1):70-73, 2022
7. A. V. Shanin and **A. I. Korolkov**. Diffraction by a Dirichlet right angle on a discrete planar lattice. *Quart. Appl. Math.*, 80:277-315, 2022
8. M. A. Mironov, A. V. Shanin, **A. I. Korolkov**, and K. S. Kniazeva. Transient processes in a gas/plate structure in the case of light loading. *Proceedings of the Royal Society A*, 477(2253):20210530, 2021
9. **A. I. Korolkov**, V. G. Andreev, V. V. Gramovich, A. M. Aleevskaya, T. V. Martynyuk, and O. V. Rudenko. Variational method of separation of the aortic and pulmonary components of the second heart sound. *Doklady Physics*, 65(8):295-299, 2020
10. **A. I. Korolkov**, K. S. Knyazeva, and A. S. Shurup. Theoretical and experimental studies of the correlation characteristics of signals reflected by a rotating propeller. *Acoustical Physics*, 66(6):676-682, 2020