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 on 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
2022-2023	Leading engineer at the Media Algorithm Laboratory, Moscow Research Center – 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 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 modeling, metamaterials

Numerical modeling
development of FEM software, numerical evaluation of oscillating integrals

Teaching experience

Lecturer in FEM modeling

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

Supervision of group student projects

Outreach teaching

        Summer camps on mathematics and physics for high schools 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 modeling 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, Modeling and design of earphones

2015 - 2016   StGobain, Design of sound absorbing metamaterials

Academic awards

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

Invited talks

2024 "WHT Follow on: the applications, generalisation 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 – 29

Selected publications

1. 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
2. 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
3. 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
4. **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
5. 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
6. 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
7. **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
8. **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

9. A. V. Shanin and **A. I. Korolkov**. Sommerfeld-type integrals for discrete diffraction problems. Wave Motion, 97:102606, 2020

10. A. V. Shanin and **A. I. Korolkov**. Diffraction by an elongated body of revolution. A boundary integral equation based on the parabolic equation. Wave Motion, 85:176-190, 2019

11. A. V. Shanin, K. S. Knyazeva, and **A. I. Korolkov**. Riemann surface of dispersion diagram of a multilayer acoustical waveguide. Wave Motion, 83:148-172, 2018

12. S. L. Denisov and **A. I. Korolkov**. Investigation of noise-shielding efficiency with the method of sequences of maximum length in application to the problems of aviation acoustics. Acoustical Physics, 63(4):462-477, 2017