

Chief Assistant Professor Nikolet Pavlova, PhD

Chief Assistant Professor, PhD, Laboratory of Synthetic Biology and Bioinformatics, Faculty of Biology, Sofia University “St. Kliment Ohridski”

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Research interests: Holding a PhD in Biological Sciences in bioinformatics, genetics, and genomics since 2019, her main interests include bacterial genome research, precise selection of genomic targets, and drug development to address increasing bacterial antibiotic resistance. Her principal contributions include developing a rational method for precisely designing chimeric antisense oligonucleotides that specifically target bacterial mRNA regions, including riboswitches, in a particular human pathogenic bacterium or group of bacteria, including multidrug-resistant bacteria, with a pronounced antibacterial effect.

Profiles in major databases

Sofia University Authors: https://authors.uni-sofia.bg/AuthorPublications.aspx?id=f1d9e162-5a4a-4042-a24a-69fed74711d2

Google Scholar: https://scholar.google.com/citations?user=HBUjwwUAAAAJ&hl=ru
with 574 citations for 30 publications and an h-index of 10
ResearchGate: https://www.researchgate.net/profile/Nikolet-Pavlova with 509 citations of 30 articles and an h-index of 10
ORCID: https://orcid.org/0000-0002-5405-9089
Scopus ID: 57201255941

Web of Science Researcher ID: https://www.webofscience.com/wos/author/record/JPX-5222-2023

Education

2019: PhD in Biological Sciences – Genetics, Genomics and Bioinformatics, Sofia University “St. Kliment Ohridski”. Thesis defended ahead of schedule.

2014 – 2016: Master’s degree **in Genetics and Genomics and award for academic excellence from Sofia University “St. Kliment Ohridski”**

2014 – 2016: Master's degree in Project Management, International Business School, Bulgaria

2010 – 2014: Bachelor's degree in Molecular Biology, Sofia University "St. Kliment Ohridski"

2010 – 2014: Bachelor's degree in Business Administration, International Business School, Bulgaria

Professional experience

Academic positions:

October 2024 – present: Chief Assistant Professor, Laboratory of Synthetic Biology and Bioinformatics, Faculty of Biology, Sofia University "St. Kliment Ohridski"

Employment history:

2**024 – present: Chief Assistant Professor, PhD, Independent Laboratory of Synthetic Biology and Bioinformatics, Faculty of Biology, Sofia University "St. Kliment Ohridski"**

2023 – present: R2 Researcher at Sofia University "St. Kliment Ohridski", working on the following projects:

- Sofia University Marking Momentum for Innovation and Technological Transfer (SUMMIT), No. 70-123-194/2.02.2024, "Development of software systems for the computational design of fast allosteric ribozymes that sense oligonucleotides with precisely defined sequences and a database of clinically significant human genetic variations for two patent applications".

- Sofia University Marking Momentum for Innovation and Technological Transfer (SUMMIT), No. 70-123-505/05.07.2023, "Design of antisense oligonucleotides conjugated to cell-penetrating oligopeptides as novel antibacterial agents against resistant human pathogenic bacteria for a European patent application".

2020 – 2022: Part-time lecturer – practical classes in Bioinformatics and Introduction to Bioinformatics in the 2020/2021 and 2021/2022 academic years for bachelor's, master's (in Bulgarian and English) and postgraduate qualification students, Faculty of Biology, Sofia University "St. Kliment Ohridski".

2021 – 2022: Development of pharmaceutical products with antibacterial activity in partnership with an international pharmaceutical company

2016 – 2019: **Doctoral student, Department of Genetics, Faculty of Biology, Sofia University "St.** Kliment Ohridski"

2009 – 2022: Freelancer, sales representative and marketing expert for Vision International People Group/Freedom Group International/Project V and BulgarBiotic Bactology

Scientific awards and contributions

1. **Best Poster Award for** "Design of novel antisense oligonucleotides targeting the flavin mononucleotide riboswitch in *Staphylococcus aureus*", 4th International Electronic Conference on Antibiotics, organized by the journal Antibiotics, May 2025 *https://penchovsky.atwebpages.com/pdf/award_NP.pdf*
   https://sciforum.net/event/ECA2025?section=#session3364
   https://penchovsky.atwebpages.com/pdf/FMN_Pavlova_18.pdf

2. **2023: Second prize from the "Stefan Angelov" Foundation for the best research by a young Bulgarian microbiologist in 2022** – Nikolet Pavlova, for: Bioinformatics and Genomic Analyses of the Suitability of Eight Riboswitches for Antibacterial Drug Targets, Nikolet Pavlova and Robert Penchovsky, Antibiotics, 2022, DOI:10.3390/antibiotics11091177, IF: 4.8, SJR=0.785, Q1 *https://www.bas.bg/?p=43141*,
   https://penchovsky.atwebpages.com/research.php?page=22

3. Two Best Poster Awards for posters presented at the 14th Congress of Microbiologists in Bulgaria with International Participation, Hisarya, Bulgaria, 2018:
   3.1 Bioinformatics Web-Based server for bacterial genome analysis
   3.2 Control of gene expression by bacterial riboswitches and their application as drug targets

   https://penchovsky.atwebpages.com/conferences.php?page=23

4. Graduated with full honors from Sofia University "St. Kliment Ohridski", with excellent grades in examinations and the master's thesis defense in the Genetics and Genomics master's program

Scientometric data

As of 1 October 2026, Chief Assistant Professor **Nikolet Pavlova,** PhD, has authored 5 book chapters, 22 scientific journal articles and 4 conference journal articles, with a total Impact Factor (IF) of 75.69. Accord**ing** to Google Scholar, 30 of her publications have been cited 574 times, with an h-**index** of 10. In the last 5 years, her work has been cited 539 times, with an h-index of 10. *https://scholar.google.com/citations?user=HBUjwwUAAAAJ&hl=bg&oi=ao*.
According to ResearchGate, 30 publications by Chief Assistant Professor Nikolet **Pavlova, PhD,** have been cited 509 times and have an h-index of 10. *https://www.researchgate.net/profile/Nikolet-Pavlova*

Scientific publications

Chief Assistant Professor Nikolet Pavlova, PhD, has authored 31 scientific publications
. https://penchovsky.atwebpages.com/publications.php
Selected scientific publications:

1. Dimitrios Kaloudas, **Nikolet Pavlova**, Martina Traykovska, Robert Penchovsky, Molecular phylogenetics, distribution and evolution of the TPP riboswitch, Genetica, DOI: 10.1007/s10709-026-00292-5, IF: 2, SJR: 0.5, Q2, 2026
https://link.springer.com/article/10.1007/s10709-026-00292-5?utm_source=rct_congratemailt&utm_medium=email&utm_campaign=nonoa_20260925&utm_content=10.1007%2Fs10709-026-00292-5

2. Dimitrios Kaloudas, **Nikolet Pavlova**, Martina Traykovska, Robert Penchovsky, Design and applications of chimeric antisense oligonucleotides that bind TPP mRNAs as antibacterial agents, Journal of Microbiological Methods, DOI: 10.1016/j.mimet.2026.107700, IF: 2.50, 2026
https://www.sciencedirect.com/science/article/pii/S016770122600312X?via%3Dihub

3. Dimitrios Kaloudas, **Nikolet Pavlova**, Martina Traykovska, Robert Penchovsky, Targeting bacterial TPP riboswitches using pVEC-conjugated chimeric antisense oligonucleotides, Methods in Enzymology, IF: 1.11
https://www.researchgate.net/publication/407481082_Targeting_bacterial_TPP_riboswitches_using_pVEC-conjugated_chimeric_antisense_oligonucleotides

4. Dimitrios Kaloudas, Martina Traykovska, **Nikolet Pavlova**, Robert Penchovsky, Design and Applications of riboregulators, ISBN:978-981-95395-6-7, Springer, publication, book chapter, 2026
https://books.google.bg/books/about/Handbook_of_Synthetic_Biology.html?id=KJma0QEACAAJ&redir_esc=y

5. Dimitrios Kaloudas, **Nikolet Pavlova**, Robert Penchovsky, Computational design and experimental validation of fast oligonucleotide-sensing allosteric ribozymes with predefined oligonucleotide binding sites, Biosystems, 2026, ISSN (print):0303-2647, ISSN (online):1872-8324, doi:10.1016/j.biosystems.2026.105886, IF (2.1 - 2025), Web of Science Quartile: Q2 (2026), SCOPUS Quartile: Q2 (2026)
https://pubmed.ncbi.nlm.nih.gov/42435967/

6. **Nikolet Pavlova**, Dimitrios Kaloudas, Martina Traykovska, Robert Penchovsky, Pharmacogenetics and Pharmacogenomics as Enabling Technologies for Precision Drug Development and Personalized Therapy, Current Drug Discovery Technologies, 2026, ISSN (print):1570-1638, ISSN (online):1875-6220, doi:10.2174/0115701638494182260723063335, SCOPUS, SJR (0.353 - 2025), SCOPUS Quartile: Q3 (2026), IF: 2.05
https://www.eurekaselect.com/article/157489

7. Robert Penchovsky, **Nikolet Pavlova**, DESIGN AND APPLICATIONS OF NOVEL ANTIBACTERIAL AGENTS BASED ON CHIMERIC ANTISENSE OLIGONUCLEOTIDES AS A NOVEL FULLY RATIONAL APPROACH TO ANTIBIOTIC DEVELOPMENT, Journal of the Bulgarian Academy of Sciences, volume: 3, 2026, pp. 30–35, ISSN (print):0007-3989, ISSN (online):2683-0302
https://journ.bas.bg/shr/articles/901-1000/p_921_1.pdf

8. Dimitrios Kaloudas, **Nikolet Pavlova**, Robert Penchovsky, Computational selection of allosteric RNAs: A review, International Journal of Biological Macromolecules, June

2026, Article: 152477, https://www.sciencedirect.com/science/article/pii/S0141813026024049?via%3Dihub, Impact Factor: 8.5, CiteScore: 10.3, SJR: 1.287 (2025), Q1 (2025).

9. Vanya Dyakova, Martina Traykovska, **Nikolet Pavlova**, Dimitrios Kaloudas, Robert Penchovsky, Rational Design of Chimeric Antisense Oligonucleotides that Target FMN Riboswitch mRNAs and Inhibit the Growth of Methicillin-Resistant Staphylococcus aureus, ACS Infectious Diseases, 2025, ISSN (print):2373-8227, doi:10.1021/acsinfecdis.5c00779, Web of Science, IF (3.8 - 2025), Web of Science Quartile: Q1 (2025), SCOPUS, SJR (1.241 - 2025), SCOPUS Quartile: Q1 (2025) https://pubs.acs.org/doi/10.1021/acsinfecdis.5c00779

10. **Nikolet Pavlova**, Vanya Dyakova, Martina Traykovska, Dimitrios Kaloudas, Robert Penchovsky, The Application of Aptamers in Pharmacological Drug Development and Therapeutic, ChemistrySelect, vol. 10, issue 28, 2025, ISSN (print):2365-6549, ISSN (online):2365-6549, doi:10.1002/slct.202502954, Web of Science, IF (1.9 - 2024), SCOPUS, SJR (0.366 - 2024), SCOPUS Quartile: Q3 (2025) https://chemistry-europe.onlinelibrary.wiley.com/doi/10.1002/slct.202502954

11. Dimitrios Kaloudas, **Nikolet Pavlova** and Robert Penchovsky, Computational Design of Allosteric Ribozymes via Genetic Algorithms, 2024, Methods in Molecular Biology, MIMB, volume 2822, RNA Amplification and Analysis, https://link.springer.com/protocol/10.1007/978-1-0716-3918-4_28

12. Robert Penchovsky, Antoniya V. Georgieva, Vanya Dyakova, Martina Traykovska and **Nikolet Pavlova**, Antisense and Functional Nucleic Acids in Rational Drug Development, Antibiotics 2024, IF: 4.3, https://doi.org/10.3390/antibiotics13030221, https://penchovsky.atwebpages.com/publications.php?page=3199

13. **Nikolet Pavlova**, Martina Traykovska, Robert Penchovsky, "Targeting FMN, TPP, SAM-I, and glmS Riboswitches with Chimeric Antisense Oligonucleotides for Completely Rational Antibacterial Drug Development", Antibiotics, 2023.

    https://pubmed.ncbi.nlm.nih.gov/37998809/

14. Dimitrios Kaloudas, **Nikolet Pavlova**, Robert Penchovsky, „GHOST-NOT and GHOST-YES: Two programs for generating high-speed biosensors with randomized oligonucleotide binding sites with NOT or YES Boolean logic functions based on experimentally validated algorithms", Journal of Biotechnology Volume 373, 20 August 2023, Pages 82-89, doi: https://doi.org/10.1016/j.jbiotec.2023.07.005

    https://www.sciencedirect.com/science/article/pii/S0168165623001323

15. Bioinformatics and Genomic Analyses of Eight Riboswitches and their Suitability for Antibacterial Drug Targets, **Nikolet Pavlova**, Allied Academies, CPD-accredited Hybrid Event, 7th International Conference on Pharmaceutics and Advanced Drug Delivery Systems, London, UK, March 2023, Q3.

16. Robert Penchovsky, **Nikolet Pavlova**, Georgi Miloshev, Antoniya Georgieva, Martina Traykovska, "Versatile Tools of Synthetic Biology applied for Drug Discovery and Production", Future Medicinal Chemistry, Q2, IF 4.75, 2022 https://pubmed.ncbi.nlm.nih.gov/35975897/

17. **Nikolet Pavlova** and Robert Penchovsky, "Bioinformatics and Genomic Analyses of the Suitability of Eight Riboswitches for Antibacterial Drug Targets", Antibiotics 2022, Impact Factor: 4.8 (2022); 5-Year Impact Factor: 4.9 (2022) https://pubmed.ncbi.nlm.nih.gov/36139956/

18. Robert Penchovsky, Georgi Miloshev, **Nikolet Pavlova**, Katya Popova, Lozena Otcheva, Aikaterini Valsamatzi, Martina Traykovska, Book: New Frontiers and Applications of Synthetic Biology; chapter 8. Small RNA-based systems for sensing and therapeutic applications, Elsevier, 2022, ISBN: 9780128244692. https://www.sciencedirect.com/book/edited-volume/9780128244692/new-frontiers-and-applications-of-synthetic-biology

19. Robert Penchovsky, **Nikolet Pavlova** and Dimitrios Kaloudas, ExBWS: Extended Bioinformatics Web Services for Sequence Analyses, International Journal of Bioinformatics Research and Applications, 2021, IF: 0.85, (Q4, Scopus)

20. Lozena A Otcheva, **Nikolet Pavlova**, Katya B Popova, Martina Traykovska and Robert Penchovsky, Why Some Riboswitches are Suitable Targets for Antibacterial Drug Discovery? - EC Microbiology 2020, IF:1.73

21. Robert Penchovsky, **Nikolet Pavlova** and Dimitrios Kaloudas, RSwitch: a novel bioinformatics database on riboswitches as antibacterial drug targets - IEEE Transactions on Computational Biology and Bioinformatics (2020), IF:2.8, (Q1, Web of Science)

22. Genome-wide bioinformatics analysis of FMN, SAM-I, glmS, TPP, Lysine, Purine, Cobalamin, and SAH riboswitches for their applications as allosteric antibacterial drug targets in human pathogenic bacteria, **Nikolet Pavlova**, Robert Penchovsky, 2019, Expert Opinion on Therapeutic Targets, IF:4,598,
23. EBWS: Essential Bioinformatics Web Services for Sequence Analysis, Dimitrios Kaloudas, **Nikolet Pavlova**, Robert Penchovsky, IEEE/ACM Transactions on Computational Biology and Bioinformatics (IEEE ACM T COMPUT BI), 2018, IF: 1,64

24. EBWS: Essential Bioinformatics Web Services for Sequence Analyses, **Nikolet Pavlova**, Dimitrios Kaloudas, Robert Penchovsky, German Conference on Bioinformatics, Vienna, Austria, 2018, Q4
25. Dimitrios Kaloudas, **Nikolet Pavlova** & Robert Penchovsky, "Lignocellulose, algal biomass, biofuels and biohydrogen": a review, Environmental Chemistry Letters volume 19, pages 2809–2824 (2021) https://link.springer.com/article/10.1007/s10311-021-01213-y

26. Dimitrios Kaloudas, **Nikolet Pavlova** & Robert Penchovsky, "Phycoremediation of wastewater by microalgae": a review, Environmental Chemistry Letters volume 19, pages 2905–2920 (2021), Published: 28 March 2021 https://link.springer.com/article/10.1007/s10311-021-01203-0

27. **Nikolet Pavlova**, Dimitrios Kaloudas, Robert Penchovsky, „Riboswitch distribution, structure, and function in bacteria“, Gene Volume 708, 5 August 2019, Pages 38-48, https://doi.org/10.1016/j.gene.2019.05.036 https://pubmed.ncbi.nlm.nih.gov/31128223/

Participation in and leadership of research projects

Leadership:

1. **Project "Inhibition of the growth of macrolide-resistant *Streptococcus pneumoniae strains infecting humans",* Contract No. КП-06-М93/1 dated 08.12.2025, December 2025 – December 2027, Total contracted funding: €30,677.51, Bulgarian National Science Fund, Principal investigator: Chief Assistant Professor Nikolet Pavlova, PhD**

https://www.uni-sofia.bg/index.php/bul/universitet_t/fakulteti/biologicheski_fakultet2/nauchna_i_mezhdunarodna_dejnost/proekt_inhibirane_na_rastezha_na_makrolidno_rezistentni_schamove_na_streptococcus_pneumoniae_infektiraschi_chovek

Participation:

2. Project "Sofia University Marking Momentum for Innovation and Technological Transfer (SUMMIT)", No. 70-123-194/2.02.2024, "Development of software systems for the computational design of fast allosteric ribozymes that sense oligonucleotides with precisely defined sequences and a database of clinically significant human genetic variations for two patent applications", Budget: BGN 200,000, duration: 2 years. *https://summit.uni-sofia.bg/mod/page/view.php?id=92&lang=bg*
https://penchovsky.atwebpages.com/research.php?page=5

3. Project "Sofia University Marking Momentum for Innovation and Technological Transfer (SUMMIT)", No. 70-123-505/05.07.2023, "Design of antisense oligonucleotides conjugated to cell-penetrating oligopeptides as novel antibacterial agents against resistant human pathogenic bacteria for a European patent application", Budget: BGN 200,000, duration: 2 years. *https://penchovsky.atwebpages.com/research.php?page=19*

4. Comparative analysis of the efficacy of novel antibacterial agents based on different antisense oligonucleotides using different molecular mechanisms of RNA inhibition, KP-06-H63/1/13.12.2022, BGN 200,000 *https://penchovsky.atwebpages.com/research.php?page=20*

5. Development of novel antibacterial agents against resistant strains of *Staphylococcus aureus and Enterococcus faecalis* using antisense oligonucleotides, КП-06 ПМ63/8, BG-175467353-2022-03-0063, BGN 40,000

6. Design and experimental testing of chimeric antisense oligonucleotides as antibacterial agents, Ministry of Education and Science, ДН/13/14/20.12.2017, 2017–2020 – "Most successful project". Results: 20 publications (total IF: 68 and 274 points based on Q1–Q4, 86 citations, participation in 3 conferences with 2 presentations and 4 posters, 16 software tools developed, 4 doctoral dissertations and 1 master's thesis defended, in collaboration with international researchers, PhD, *https://penchovsky.atwebpages.com/research.php?page=13*

7. Antisense oligonucleotides that specifically bind to FMN and SAM riboswitches in human pathogenic bacteria, 80-10-45/10.04.2019, 2019, successful doctoral dissertation defense and participation in international conferences

8. Training and development of highly qualified young researchers and lecturers for innovative interdisciplinary research benefiting biomedicine, Ministry of Education and Science, BG05M2OP001-2.009-0019-C01/02.06.2017, 2017–2018

9. Novel methods for developing antibiotics against resistant *Escherichia coli strains using antisense oligonucleotides that inhibit biochemical pathways controlled by riboswitches,* Sofia University Research Fund, Contract No. **80-10-100/20.04.2017**,

10. Novel methods for discovering antibiotic agents against resistant *Staphylococcus aureus* strains using antisense oligonucleotides, Sofia University Research Fund, 179/13.04.2016, 2016–2017

11. Application of antisense oligonucleotides for specific inhibition of bacterial RNAs as a novel method for developing antibiotics, 12/27.03.2015, 2015

Participation in scientific forums:

1. Invited participation in the international conference "8th European Congress on Infectious Diseases (CPD Accredited)", Budapest, Hungary, 24–26 September 2026, with a presentation entitled: The most suitable riboswitches as targets for antibacterial drug discovery - Bioinformatics, genomic, and laboratory analyses
2. Invited participation in the international conference Antibiotics 2026– Challenges and Strategies for Antibiotic Resistance Crisis, organized by the journal Antibiotics, May 2026, Barcelona, Spain, with a presentation entitled: "Bioinformatics and genomic analysis for the potential of mRNAs as antibacterial drug targets in the genome of macrolide-resistant strains of *Streptococcus pneumoniae* infecting humans for novel antisense oligonucleotide design". *https://sciforum.net/paper/view/30521* The event program is available at: *https://sciforum.net/event/Antibiotics2026?section=#book_of_abstracts*

3. Invited participation in the 4th International Electronic Conference on Antibiotics – Challenges and Strategies for Antibiotic Resistance Crisis, organized by the journal Antibiotics, May 2025, with a presentation and poster entitled: "Design of novel antisense oligonucleotides targeting the flavin mononucleotide riboswitch in Staphylococcus aureus". The poster is available at: https://penchovsky.atwebpages.com/pdf/FMN_Pavlova_18.pdf. The award is available at: https://penchovsky.atwebpages.com/pdf/award_NP.pdf

4. Participation with two posters in the Second Annual Conference on the Activities and Results of the SUMMIT Project (Sofia University Marking Momentum for Innovation and Technological Transfer), 1 April 2025, Sofia University "St. Kliment Ohridski", Sofia, Bulgaria. Information about *the event is available at: https://uni-*

sofia.bg/index.php/bul/novini/novini_i_s_bitiya/vtora_godishna_konferenciya_po_proekta_summit

4.1 "Design of antisense oligonucleotides conjugated to cell-penetrating oligopeptides as novel antibacterial agents against resistant human pathogenic bacteria", **Nikolet Pavlova**, Martina Traykovska, Robert Penchovsky – poster reporting results of project No. 70-123-505/05.07.2023 for a European patent application

4.2 "Development of software systems for the computational design of fast allosteric ribozymes that sense oligonucleotides with precisely defined sequences and a database of clinically significant human genetic variations", Nikolet Pavlova, **Martina Traykovska**, Robert Penchovsky – poster reporting results of project No. 70-123-194/12.02.2024 for two European patent applications.

https://penchovsky.atwebpages.com/conferences.php

5. **Invited participation in the 7th International Conference on Pharmaceutics and Advanced Drug Delivery Systems,** Allied Academies, CPD-accredited hybrid event**, London, UK, March 27–28, 2023, with a presentation and poster entitled:** Bioinformatics and Genomic Analyses of Eight Riboswitches and their Suitability for Antibacterial Drug Targets, **Nikolet Pavlova**
https://alliedacademies.com/pharmaceutical-science-2023/2023/about
https://alliedacademies.com/pharmaceutical-science-2023/2023/scientific-program-pdfs

6. **Participation in the 14th Congress of Microbiologists in Bulgaria with International Participation, Hisarya, Bulgaria, with two posters, each receiving a Best Poster Award.**

6.1. Nikolet Pavlova, Robert Penchovsky, Bioinformatics Web-Based server for bacterial genome analysis, 14th Congress of Microbiologists in Bulgaria with International Participation, 2018, PhD *https://penchovsky.atwebpages.com/conferences.php*

6.2 Lozena A. Otcheva, Katya B. Popova, Nikolet Pavlova, Martina Traykovska, Robert Penchovsky, Control of gene expression by bacterial riboswitches and their application as drug targets, 14th Congress of Microbiologists in Bulgaria with International Participation, 2018, PhD https://penchovsky.atwebpages.com/conferences.php?page=23

7. **Poster presentation at the German Conference on Bioinformatics, held exceptionally in Vienna, Austria**. **Nikolet Pavlova**, Dimitrios Kaloudas, Robert Penchovsky, Essential Bioinformatics Web Services for Sequence Analyses, German Conference on Bioinformatics, Vienna, Austria, 2018, SCOPUS Quartile: Q4 (SCOPUS), in collaboration with international researchers, PhD https://penchovsky.atwebpages.com/conferences.php?page=22