

CURRICULUM VITAE

Name:

Tudor LUCHIAN

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Author ID: 8848508500)

Date and place of birth:

February 26, 1968, Falticeni, Romania

Nationality:

Romanian

Education:

1994-1997 Ph.D. studies at the 'Karl-Franzens' University of Graz (Austria)

1987-1992 Faculty of Physics, 'Alexandru I. Cuza' University Iasi, Romania
(*Bachelor of science* degree in Biophysics)

1982-1986 'Nicu-Gane' High School, Falticeni, Romania

Present academic and leadership position:

Professor (Faculty of Physics, Department of Biophysics & Medical Physics, 'Alexandru I. Cuza' University, Iasi, Romania), Ph. D. adviser in the field of 'Physics'

Leader of *Molecular Biophysics and Medical Physics research group*, 'Alexandru I. Cuza' University, Iasi, Romania (<https://eeris.eu/ERIF-2000-000Q-0703>)

Career:**March 2012-October 2020**

Director, Department and Institute of Interdisciplinary Research 'Alexandru I. Cuza' University, Iasi, Romania

July 2006 – October 2006

Invited scientist at University of Oxford (UK)

July 2001 – July 2003

Assistant research scientist at Texas A&M University (College Station, Texas, USA). The assigned projects regarded the study of biophysical aspects of molecular interactions taking place into a nanopore, through single-channel electrical recordings. The head of the group was Prof. Hagan Bayley and projects were primarily funded by the Office of Naval Research (ONR - Department of Defense), National Institute of Health (NIH).

September 1999 – June 2001

Assistant Professor at 'Alexandru I. Cuza' University, Faculty of Physics, Dept. of Medical Physics & Biophysics)

August 1998 – September 1999

Research officer at the University of Queensland (Brisbane, Australia). The assigned project was part of a joint-venture between the Department of Physiology & Pharmacology (Prof. David J. Adams) and Centre for

Drug Design and Development (Dr. Richard Lewis) and primarily financed by an Australian pharmaceutical company (AMRAD-Melbourne). The major focus of my project was to implement and develop specific electrophysiological techniques (e.g., ‘two-electrode-voltage-clamp’ measurements on *Xenopus* oocytes, whole-cell recording on dorsal-root ganglions) for the physiological assessment and pharmacological characterization of new-designed drugs aimed at the relief of chronic pain.

October 1997 – August 1998

Teaching assistant at ‘Alexandru I. Cuza’ University, Faculty of Physics, Dept. of Medical Physics & Biophysics)

December 1994 - October 1997

Ph. D. student at the ‘Karl-Franzens’ University (Faculty of Physics, Biophysics) under the main supervision of Dr. Wolfgang Schreibmayer. On the 27th of October 1997, I have defended with the best grade (*‘Mit Auszeichnung Bestanden’*), my Ph. D. thesis entitled **‘Gating modulation of a G protein activated, inwardly rectifying potassium channel by a cytosolic applied peptide’**.

September 1994 - November 1994

Visiting scientist at the ‘Karl-Franzens’ University of Graz, Faculty of Medicine (Graz, Austria) in the laboratory headed by Dr. Wolfgang Schreibmayer (Molecular Physiology Group).

January 1994 - April 1994

I have attended the European ERASMUS Course in Medical Physics and Biomedical Engineering held at the University of Patras (Patras, Greece).

August 1992 - August 1993 and May 1994 - August 1994

Research scientist at the Biological Research Center, Institute of Biophysics (Szeged, Hungary). The research topic covered concerned bacteriorhodopsin's photocycle.

July 1992

Having graduated from the Faculty of Physics (Biophysics), ‘Alexandru I. Cuza’ University of Iasi (Romania) with the diploma thesis entitled **‘The influence of chronic denervation on the excitability of the striate muscle’**, I was employed as a research assistant at the Faculty of Physics, Department of Biophysics, ‘Alexandru I. Cuza’ University, Iasi, Romania.

Selected papers published in peer-reviewed journals as ‘main author’

1. Loredana Mereuta, Jonggwan Park, Yoonkyung Park, **Tudor Luchian**, Repurposing an Antimicrobial Peptide for the Development of a Dual Ion Channel/Molecular Receptor-Like Platform for Metal Ions Detection, *Nanoscale*, 2024, 16, 15984-15994 (<https://doi.org/10.1039/D4NR02433H>)
2. Loredana Mereuta, Huma Bhatti, Alina Asandei, Adina Cimpanu, Yi-Lun Ying, Yi-Tao Long, **Tudor Luchian**, Controlling DNA Fragments Translocation across Nanopores with the Synergic Use of Site-Directed Mutagenesis, pH-Dependent Charge Tuning, and Electroosmotic Flow, *ACS Applied Materials & Interfaces*, 2024, <https://doi.org/10.1021/acsami.4c03848>
3. Loredana Mereuta, Alina Asandei, Ioan Andricioaei, Jonggwan Park, Yoonkyung Park, **Tudor Luchian**, Considerable Slowdown of Short DNA Fragment Translocation Across a Protein Nanopore Using pH-induced Generation of Enthalpic Traps Inside the Permeation Pathway, *Nanoscale*, 2023, DOI: 10.1039/D3NR03344A
4. Loredana Mereuta, Alina Asandei, Irina Schiopu, Jonggwan Park, Yoonkyung Park, **Tudor Luchian**, Synthetic receptor based on a peptide antibiotic-functionalized chimera for hybridization-based polynucleotides detection, *ACS Applied Materials & Interfaces*, 2023, <https://doi.org/10.1021/acsami.3c06086>
5. Loredana Mereuta, Alina Asandei, , Isabela Dragomir, Jonggwan Park, Yoonkyung Park, **Tudor Luchian**, A nanopore sensor for multiplexed detection of short polynucleotides based on length-

- variable, poly-arginine-conjugated peptide nucleic acids, *Analytical Chemistry*, 2022, <https://doi.org/10.1021/acs.analchem.2c01587>
6. Alina Asandei, Loredana Mereuta, Irina Schiopu, Jonggwan Park, Chang Ho Seo, Yoonkyung Park, **Tudor Luchian**, Non-Receptor-Mediated Lipid Membrane Permeabilization by the SARS-CoV-2 Spike Protein S1 Subunit, *ACS Applied Materials & Interfaces*, 2020, 12, 50, 55649–55658
 7. Alina Asandei, Giovanni Di Muccio, Irina Schiopu, Loredana Mereuta, Isabela S. Dragomir, Mauro Chinappi, **Tudor Luchian**, Nanopore-Based Protein Sequencing Using Biopores: Current Achievements and Open Challenges, *Small Methods*, 2020, 1900595, DOI: 10.1002/smt.201900595
 8. Alina Asandei, Loredana Mereuta, Jonggwan Park, Chang Ho Seo, Yoonkyung Park, **Tudor Luchian**, Non-Functionalized PNAs as Beacons for Nucleic Acids Detection in a Nanopore System, *ACS Sensors*, 2019, 4, 6, 1502-1507
 9. **Tudor Luchian**, Yoonkyung Park, Alina Asandei, Irina Schiopu, Loredana Mereuta, Aurelia Apetrei, Nanoscale Probing of Informational Polymers with Nanopores. Applications to Amyloidogenic Fragments, Peptides and DNA-PNA Hybrids, *Accounts of Chemical Research*, 2019, 52 (1), pp 267–276
 10. Andrei Ciuca, Alina Asandei, Irina Schiopu, Aurelia Apetrei, Loredana Mereuta, Chang Ho Seo, Yoonkyung Park, **Tudor Luchian**, Single Molecule, Real-Time Dissecting of Peptide Nucleic Acids-DNA Duplexes with a Protein Nanopore Tweezer, *Analytical Chemistry*, 2018, 90 (12), pp 7682–7690
 11. Alina Asandei, Irina Schiopu, Mauro Chinappi, Chang Ho Seo, Yoonkyung Park, **Tudor Luchian**, Electroosmotic Trap Against the Electrophoretic Force Near a Protein Nanopore Reveals Peptide Dynamics During Capture and Translocation, *ACS Applied Materials & Interfaces*, 2016, 8 (20), pp 13166–13179
 12. Alina Asandei, Mauro Chinappi, Jong-kook Lee, Chang Ho Seo, Loredana Mereuta, Yoonkyung Park, **Tudor Luchian**, Placement of oppositely charged aminoacids at a polypeptide termini determines the voltage-controlled braking of polymer transport through nanometer-scale pores, *Scientific Reports (Nature Publishing Group)* 5, 10419; DOI: 10.1038/srep10419 (2015)
 13. Loredana Mereuta, Alina Asandei, Chang Ho Seo, Yoonkyung Park, **Tudor Luchian**, Quantitative Understanding of pH- and Salt-Mediated Conformational Folding of Histidine-Containing, β -Hairpin-like Peptides, Through Single-Molecule Probing with Protein Nanopores, *ACS Applied Materials & Interfaces*, 2014, 6 (15), pp 13242–13256
 14. Loredana Mereuta, Mahua Roy, Alina Asandei, Jong Kook Lee, Yoonkyung Park, Ioan Andricioaei, **Tudor Luchian**, Slowing down single-molecule trafficking through a protein nanopore reveals intermediates for peptide translocation, *Scientific Reports (Nature Publishing Group)*, 2014, Jan 27;4:3885. DOI: 10.1038/srep03885
 15. **Tudor Luchian**, Seong Ho Shin, Hagan Bayley, Single-molecule chemistry with spatially separated reactants, *Angewandte Chemie International Edition*, 42, 3766-3771, 2003
 16. Seong-Ho Shin, **Tudor Luchian**, Steve Cheley, Orit Braha, Hagan Bayley, Kinetics of a reversible covalent-bond-forming reaction observed at the single-molecule level, *Angewandte Chemie International Edition*, 41 (19): 3707-3709, 2002 (highlighted by Nature – science update, 7 October 2003)
 17. **Tudor Luchian**, Seong Ho Shin, Hagan Bayley, Kinetics of a three-step reaction observed at the single-molecule level, *Angewandte Chemie International Edition* 42, 1925-1929, 2003 (reviewed in C & En News, May 5, 2003)
 18. **Tudor Luchian**, Nathan Dascal, Carmen Dessauer, Dieter Platzer, Norman Davidson, Henry Lester, Wolfgang Schreibmayer, A C-terminal peptide of the GIRK1 subunit directly blocks the G protein-activated K⁺ channel (GIRK1) expressed in *Xenopus* oocytes, *J. Physiology (London)*, 505.1, 13-22, 1997 (reviewed in *J. Physiology*, 505.1, 1997)

Selected, peer-reviewed work of ‘science-society’- related aspects

1. Tudor Luchian, ‘Balkan science: how to halt the brain drain’, *Nature*, 2011, 470 (7334), 333-333
2. Tudor Luchian, ‘Romanian funding cuts calls for more stringent criteria’, *Nature*, 2009, 458, 1101

Selected citations of papers published as ‘main author’

1. Yesi S., Xueyan Z. et al., Chemically Modified Platforms for Better RNA Therapeutics, **Chemical Reviews**, (2024), 124, 3, 929–1033
2. Jeong, K.B., Ryu, M., Kim, J.S. et al. Single-molecule fingerprinting of protein-drug interaction using a funneled biological nanopore, **Nature Communications** (2023), 14 (1461), <https://doi.org/10.1038/s41467-023-37098-4>
3. Cressiot, B., Greive, S.J., Mojtavavi, M. et al. Thermostable virus portal proteins as reprogrammable adapters for solid-state nanopore sensors, **Nature Communications** (2018), 9 (4652), <https://doi.org/10.1038/s41467-018-07116-x>
4. Angevine, C. E. , Robertson, J.W.F. et al., Laser-based temperature control to study the roles of entropy and enthalpy in polymer-nanopore interactions, **Science Advances** (2021), 7:eabf5462, DOI: 10.1126/sciadv.abf5462
5. De Coster, W., Weissensteiner, M.H. & Sedlazeck, F.J., Towards population-scale long-read sequencing, **Nature Reviews Genetics** (2021), 22, 572–587, <https://doi.org/10.1038/s41576-021-00367-3>
6. Ying, Y.L., Hu, Z.L., Zhang, S. et al., Nanopore-based technologies beyond DNA sequencing, **Nature Nanotechnology** (2022), 17, 1136–1146, <https://doi.org/10.1038/s41565-022-01193-2>
7. Ouldali, H., Sarthak, K., Ensslen, T. et al., Electrical recognition of the twenty proteinogenic amino acids using an aerolysin nanopore, **Nature Biotechnology** (2020), 38, 176–181, <https://doi.org/10.1038/s41587-019-0345-2>
8. Alfaro, J.A., Bohländer, P., Dai, M. et al., The emerging landscape of single-molecule protein sequencing technologies, **Nature Methods** (2021), 18, 604–617, <https://doi.org/10.1038/s41592-021-01143-1>
9. Krishnan R, S., Jana, K., Shaji, A.H. et al., Assembly of transmembrane pores from mirror-image peptides, **Nature Communications** (2022), 13 (5377), <https://doi.org/10.1038/s41467-022-33155-6>
10. Zhang, Y., Yi, Y., Li, Z., et al., Peptide sequencing based on host–guest interaction-assisted nanopore sensing, **Nature Methods** (2023), DOI: 10.1038/s41592-023-02095-4
11. Huang, G., Voet, A., Maglia, G., FraC nanopores with adjustable diameter identify the mass of opposite-charge peptides with 44 dalton resolution, **Nature Communications** (2019), 10 (835), <https://doi.org/10.1038/s41467-019-08761-6>

Patents:

Hagan Bayley, Seong-Ho Shin, **Tudor Luchian**, Steve Cheley – ‘New system comprising a sensing device, a protein pore, a detection system and an ionic solution containing a reactive analyte capable of covalently bonding to the protein probe, useful for sensing a reactive analyte in a solution’, Patent Number(s): WO2003095669-A; WO2003095669-A1; US2003215881-A1; AU2003245272-A1; EP1504114-A1

PARK Y, LUCHIAN T, APETREI A, CIUCA A - ‘Sensor for detecting bacteria within aqueous sample, has container for containing fluid included with electrolyte, and measuring apparatus for measuring change of electric signal between first fluid compartment and second fluid compartment’, Patent Number(s): KR2018108281-A; KR1909446-B1, Patent Assignee Name(s) and Code(s): UNIV CHOSUN IND ACADEMIC COOP FOUND(CHOS-C), Derwent Primary Accession Number: 2018-783708

Others:

- Topic Editor for the Nanoscience section in *Frontiers in Chemistry*, "Nanopore/nanochannel: Fundamentals and Advanced Applications" (<https://www.frontiersin.org/research-topics/35241/nanoporenanochannel-fundamentals-and-advanced-applications>)
- Recipient of the ‘Stefan Procopiu’ prize, Romanian Academy, 2012
- Recipient of the 1st prize on the ‘Researcher of the Year’ section, 2011, ‘Gala Premiilor in Educatie’ (‘Dinu Patriciu’ foundation)

- The ‘Gheorghe Benga’ prize for the year 2008, awarded in 2009 by UMF-Iuliu Hatieganu, Cluj-Napoca
- The history and current state of my laboratory has been reviewed in an article which appeared in ‘Science Careers, from the journal ‘Science’. (see ‘In Person: A Dream Lab in Romania’, at http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2009_12_11/caredi.t.a0900153
- Scientific evaluator Fulbright Romania
- Scientific evaluator Austrian Science Fund (FWF)
- Scientific evaluator National Science Foundation (USA)
- Editorial Board Member for Scientific Reports, a journal from Nature Publishing Group (2016)
- Member in the ‘Management board’ of National Institute of Applied Physics in Iasi (2016)
- Advisory Editor for European Biophysics Journal (2017)

Research projects implemented as ‘Principal Investigator’-PI

1. ‘Nanoscale approach towards studying couplings between biomembranes, bacterial toxins and proteins with roles in drug penetration’, 2006, CEEX-Modul I (CERES)
2. ‘Integrated laboratory of virtual instrumentation in biophysics’, National Instruments (Texas, Austin, USA), 2006
3. ‘Molecular characterization of action mechanisms of antimicrobial peptides and de novo prediction of structures with enhanced antimicrobial potential’, 2007, PN II – CNMP
4. ‘Elucidation of mechanisms of interaction of selected cytotoxic peptides with tumor cells, and optimization of anti-tumoral properties of such peptides’, 2008, PN II – CNMP
5. ‘Ion sensing and separation through modified cyclic peptides, cyclodextrins and protein pores’, PN-II-ID-PCCE-2011-2-0027, 2012, UEFISCDI
6. ‘Rational design and generation of synthetic, short antimicrobial peptides. Linking structure to function’, PN-II-PT-PCCA-2011-3.1-0595, 2012
7. ‘Design and development of therapeutic AMP’s against epidemic superbugs’, Global Research Laboratory (NRF-2014K1A1A2064460; Republic of Korea), 2015
8. ‘A nanopore tweezer-based approach for studying intermolecular interactions at uni-molecular level. Application to exploring metal-mediated, mismatched base pairs hybridization in nucleic acids’ (NANOTWEEZ) Grant no. PN-III-P4-ID-PCE-2016-0026, nr. 33/12.07.2017
9. ‘Emerging molecular technologies based on micro and nano-structured systems with biomedical applications’ (TehnoBioMed), PCCDI – UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0010 / 74PCCDI / 2018 (PNCIDI III)
10. ‘Label-free, real-time detection platform of Hepatitis B Virus antigens with protein biosensors, project number PN-III-P2-2.1-PED-2019-0016, PI-UAIC
11. “Xeno nucleic acids-mediated, real-time multiplexed detection of disease relevant miRNAs, with single molecule sensitivity and selectivity, PCE- UEFISCDI 2020

12. Development of Core Technology for Advanced Peptide-based New Drugs and Establishment of the Platform', (National Research Foundation of Korea (NRF)), PI (Republic of Korea)– Prof. Yoonkyung Park, PI (UAIC) – Prof. dr. Tudor Luchian, Conf. dr. Loredana Mereuta, 2024-2028

October, 2024

Tudor Luchian, Ph. D., Professor

