

Besik I. Kankia

Department of Chemistry and Biochemistry
The Ohio State University
100 West 18th Avenue
Columbus, OH 43210

EDUCATION

Ph. D. Institute of Biological Physics of the Russian Academy of Sciences, Moscow, Russia, 1989
Thesis: "Hydration of nucleic acids. Acoustic and densimetric investigation"

M. S. Department of Biological Physics, College of Physics, Georgia State University, Tbilisi, Republic of Georgia, 1985

CITIZENSHIP Naturalized U.S. Citizen

RESEARCH EXPERIENCE

2011– present, Senior Research Scientist, Department of Chemistry and Biochemistry, The Ohio State University

- ◆ Quadruplex-based probes with intrinsic fluorescence for DNA detection
- ◆ Isothermal assays for DNA amplification
- ◆ Quadruplexes as building material and fuels for nucleic acid nanotechnology

2007 – 2011, Research Scientist and Manager of the BICF (Biomolecular Interactions Characterization Facility), Department of Chemistry, The Ohio State University

- ◆ Development of quadruplex-based probes and other technology
- ◆ Mechanism of DNA strand-exchange reactions by HIV-1 nucleocapsid protein
- ◆ Managed BICF and trained students, postdocs, and faculty in the use of CD, ITC, DSC, fluorimeters, and phosphorimager

2004 – 2007, Research Associate, Department of Chemistry, University of Minnesota
(Supervisor: Professor Karin Musier-Forsyth)

- ◆ Mechanism of DNA strand-exchange reactions by HIV-1 nucleocapsid protein
- ◆ Kinetic and thermodynamics of HIV-1 NC nucleocapsid protein-DNA interactions

2001 – 2004, Research Associate, Department of Biochemistry, Molecular Biology and Biophysics
(Supervisor: Professor Victor Bloomfield)

- ◆ Thermodynamics of DNA aptamers
- ◆ Mg²⁺-induced triplex formation of poly(rA) and poly(rU)
- ◆ Aggregation and resolubilization of polynucleotides by Mg²⁺ and spermine

1997 – 2001, Research Associate, College of Pharmacy, University of Nebraska Medical Center
(Supervisor: Professor Luis Marky)

- ◆ Thermodynamics of ligand binding to nucleic acids
- ◆ Thermodynamics of oligomer duplexes with covalently attached ligands
- ◆ Folding of the thrombin-binding aptamer into a G-quadruplex with different cations

1993 – 1997, Visiting Scientist, Max Planck Institute of Biophysical Chemistry, Germany

- ◆ B-Z and B-A transitions in DNA
- ◆ Binding of actinomycin D to single-stranded DNA

1992 – 1993, Postdoctoral Fellow, Institute of Bioscience and Human Technology, Tsukuba, Japan

- ◆ Cation binding to nucleic acids and chelating agents

1989 – 1991, Junior Scientist, Institute of Physiology, Tbilisi, Georgia.

- ◆ Hydration effects of divalent cation upon binding to EDTA

FELLOWSHIPS AND AWARDS

1992-1993 Sciences and Technology Agency Fellowship, Japan

1994-1996 Max Planck Fellowship, Germany

GRANTS

2011-2014 Bill and Melinda Gates Foundation, Point-of-Care Diagnostics, PI: “Quadruplex-based technology for isothermal DNA amplification and non-enzymatic detection”, \$900,000 total costs

2012-2014 Roche - global health-care company, PI: “QPA-based exponential amplification of long sequences coupled with beads”, \$100,000 total costs

2012-2015 Rustaveli foundation (Republic of Georgia), PI: “Thermodynamics of DNA quadruplexes”, \$90,000 total costs

2015-2017 Roche - global health-care company, PI: “QPA for isothermal, non-biased, linear amplification”, \$140,000 total costs

2018-2021 Rustaveli foundation (Republic of Georgia), PI: “Quadruplex priming amplification for molecular diagnostics and DNA sequencing”, \$90,000 total costs

REVIEWING MANUSCRIPTS for *Nucleic Acids Res.*, *J. Mol. Biol.*, *Biophys. J.*, *Biopolymers*, *FEBS Letters*, *Biochimie*, etc.

PROFESSIONAL AFFILIATIONS Biophysical Society since 1997

TEACHING EXPERIENCE

The Ohio State University, Columbus, OH

- ◆ Directly supervised seven undergraduate students:

Sean Kelley, Sep 2008 – Aug 2010, Graduate student at Toledo University Medical School

John Johnson, Sep 2008 – Jun 2010, Researcher at Boehringer-Ingelheim Roxane Inc.

Salome Boroda, Jun-Aug 2010, Graduate student at Biochemistry Dep. Of University Virginia

Robert Okyere, Sep 2010 – 2013, Graduate student at Harvard Medical School

Anupama Joseph, Sep 2010 – 2013 Graduate student at OSU Medical School

Adam Taylor, Jan 2011 – 2013 Graduate student at OSU Medical School

Aakaash Paladugu, Sep 2014 - present

- ◆ Directly supervised one technician:

John Johnson, Aug – Dec 2011, Researcher at Boehringer-Ingelheim Roxane Inc, Columbus

- ◆ Directly supervised two postdocs:
Shota Gogichaishvili, Feb 2012 – present
Tamar Partskhaladze, Jun 2012 – present
- ◆ Directly supervised three visiting scholars:
Jordan Mathias, Jun-Aug 2011, Assistant Professor of Chemistry, College of Science and Technology, Armstrong Atlantic State University, Savannah, Georgia
David Gvardjaladze, 2012-2013, Graduate student at Ilia University, Tbilisi, Rep. of Georgia
Levan Lomidze, 2012-current, Graduate student at Ilia University, Tbilisi, Rep. of Georgia
- ◆ Taught faculty, undergraduate and graduate students how to plan, carry out and analyze experiments on optical and calorimetric measurements of biopolymers.

University of Minnesota, Minneapolis, MN

- ◆ Lectured in a graduate/advanced undergraduate Nucleic Acid Chemistry course (1 lecture, Spring of 2006)
- ◆ Directly supervised an undergraduate student (Summer of 2005)
- ◆ Trained graduate students and postdocs on use of a departmental circular dichroism spectropolarimeter (2005-present)

University of Nebraska Medical Center, Omaha, NE

- ◆ Directly supervised two undergraduate students.
- ◆ Taught undergraduate and graduate students how to plan, carry out and analyze experiments on optical, calorimetric and density measurements of nucleic acids.

LIST OF PUBLICATIONS:

1. V. A. Buckin, **B. I. Kankiya**, N. V. Bulichev, A. V. Lebedev, I. Ya. Gukovsky, V. P. Chuprina, A. P. Sarvazyan & A. R. Williams, "Measurement of Anomalously High Hydration of (dA)_n·(dT)_n Double Helices in Dilute Solutions", *Nature* **340**, 321-322 (1989).
2. V. A. Buckin, **B. I. Kankiya**, A. P. Sarvazyan & H. Uedaira, "Acoustical Investigation of Poly(dA)•poly(dT), Poly(d(A-T))•poly(d(A-T)), Poly(A)•poly(U) and DNA Hydration in Dilute Aqueous Solutions", *Nucleic Acids Res.* **17**, 4189-4201 (1989).
3. V. A. Buckin, **B. I. Kankiya** & R. L. Kazaryan, "Hydration of Nucleosides in Dilute Aqueous Solutions. Ultrasonic Velocity and Density Measurements", *Biophys. Chem.* **34**, 211-223 (1989).
4. V. A. Buckin, **B. I. Kankiya**, D. Rentzeperis & L. A. Marky, "Mg²⁺ Recognizes DNA Sequence Through its Hydration Shell", *J. Am. Chem. Soc.* **116**, 9423-9429 (1994).
5. **B. I. Kankia**, "A Possible Evolution of the Genetic Code", *Proc. Acad. Sci. Georgia, Biological Series* **20**, 11-14 (1994).
6. I. G. Khutsishvili, **B. I. Kankia**, J. G. Chkhaberidze & V. G. Bregadze, "Spectrophotometric Investigation of DNA Complex with Bromide Dodecyltrimethylammonium", *Biofizika* **42**, 343-346 (1997).
7. **B. I. Kankia**, Th. Funck, H. Uedaira & V. A. Buckin, "Volume and Compressibility Effects in the Formation of Metal-EDTA Complexes", *J. Sol. Chem.* **26**, 877-888 (1997).

8. E. A. Jares-Erijman, R. Klement, R. Machinek, R. M. Wadkins, L. A. Marky, **B. I. Kankia** & T. M. Jovin, "Binding of Actinomycin D to Single-Stranded DNA", *Nucleosides and Nucleotides* 16, 661-667 (1997).
9. G. M. Mrevlishvili, **B. I. Kankia**, T. J. Mdzinarashvili, T. I. Brelidze, M. M. Khvedelidze, N. O. Metreveli & G. Z. Razmadze, "Liposome-DNA interaction: microcalorimetric study", *Chemistry and Physics of Lipids* 94, 139-143 (1998).
10. **B. I. Kankia**, Th. Funck & L. A. Marky, "Hydrolysis of *cis*- and *trans*-Diammineplatinum(II) Complexes: Hydration, Equilibrium, and Kinetic Properties", *J. Sol. Chem.* 28, 1249-1261 (1999).
11. **B. I. Kankia** & L. A. Marky, "DNA, RNA and DNA/RNA Oligomer Duplexes: A Comparative Study of their Stability, Heat, Hydration and Mg^{2+} Binding Properties", *J. Phys. Chem. B* 103, 8759-8767 (1999).
12. **B. I. Kankia**, "Hydration Effects of Ni^{2+} Binding to Synthetic Polynucleotides with Regularly Alternating Purine-pyrimidine Sequences", *Nucleic Acids Res.* 28, 911-916 (2000).
13. **B. I. Kankia**, "Interaction of Alkaline-earth Metal Ions with Calf Thymus DNA. Volume and Compressibility Effects in Diluted Aqueous Solutions", *Biophys. Chem.* 84, 227-237 (2000).
14. T. Bronich, **B. I. Kankia**, A. V. Kabanov & L. A. Marky, "A Thermodynamic Investigation of the Interaction of Polycations with DNA", *Polymer Preprints* 41(2) 1611-1612 (2000).
15. L. A. Marky, D. W. Kupke & **B. I. Kankia**, "Volume Changes Accompanying the Interaction of Ligands with Nucleic Acids" *Methods Enzymol.* 340, 149-165 (2001).
16. **B. I. Kankia**, V. Buckin & V. A. Bloomfield, "Hexamminecobalt(III) – Induced Condensation of Calf Thymus DNA: Circular Dichroism, and Hydration Measurements", *Nucleic Acids Res.* 29, 2795-2801 (2001).
17. **B. I. Kankia** & L. A. Marky, "Folding of the Thrombin Aptamer into a G-Quadruplex with Sr^{2+} : Stability, Heat and Hydration", *J. Am. Chem. Soc.* 123, 10799-10804 (2001).
18. A. M. Soto, **B. I. Kankia**, P. Dande, B. Gold, & L. A. Marky, "Incorporation of 5-(3-aminopropyl)-2'-deoxyuridine in DNA Hairpins: Thermodynamics and Hydration", *Nucleic Acids Res.* 29, 3638-3645 (2001).
19. **B. I. Kankia**, D. W. Kupke & L. A. Marky, "Incorporation of Cisplatin into Duplex DNA Immobilizes Structural Water Molecules", *J. Phys. Chem. B* 105, 11402-11405 (2001).
20. A. M. Soto, **B. I. Kankia**, P. Dande, B. Gold, & L. A. Marky, "Thermodynamic and Hydration Effects for the Incorporation of a Cationic Aminopropyl Chain into DNA", *Nucleic Acids Res.* 30, 3171-3180 (2002).
21. **B. I. Kankia**, A. M. Soto, N. Burns, R. Shikiya, C. Tung and L. A. Marky, "DNA Oligonucleotide Duplexes Containing Intramolecular Platinated Crosslinks: Energetics, Hydration, Sequence and Ionic Effects", *Biopolymers* 65, 218-227 (2002).
22. **B. I. Kankia**, "Binding of Mg^{2+} to Single-stranded Polynucleotides: Hydration and Optical Studies", *Biophys. Chem.* 104, 643-654 (2003).
23. **B. I. Kankia**, " Mg^{2+} -induced Triplex Formation of An Equimolar Mixture of Poly(rA) and Poly(rU)", *Nucleic Acids Res.* 31, 5101-5107 (2003).
24. **B. I. Kankia**, "Innere-sphere Complexes of Divalent Cations with Single Stranded RNA polymers", (2004) *Biopolymers* 74, 232-239 (2004).
25. **B. I. Kankia**, "Optical Absorption Assay for Strand-exchange Reactions in Unlabeled Nucleic Acids" *Nucleic Acids Res.* 32, e154 (2004).
26. **B. I. Kankia**, G. Barany and K. Musier-Forsyth, "Unfolding of Thrombin Binding Aptamer DNA Quadruplex Induced by HIV-1 Nucleocapsid Protein" *Nucleic Acids Res.* 33, 4395-4403 (2005).

27. **B. I. Kankia**, “A Real-time Assay for Monitoring Nucleic Acid Cleavage by Quadruplex Formation” *Nucleic Acids Res.* *34*, e141 (2006).
28. **B. I. Kankia**, K. Musier-Forsyth “The HIV-1 DNA Flap Region Contains “Flapping” Third Strand” *Biophys. Chem.* *127*, 64-68 (2007).
29. K. Post, **B. Kankia**, S. Gopalakrishnan, V. Yang, E. Cramer, P. Saladores, R.J. Gorelick, J. Guo, K. Musier-Forsyth and J.G. Levin. “Fidelity of plus-strand priming requires the nucleic acid chaperone activity of HIV-1 nucleocapsid protein” *Nucleic Acids Res.* *37*, 1755-66 (2009).
30. **B. I. Kankia**, “Self-dissociative primers for nucleic acid amplification and detection based on DNA quadruplexes with intrinsic fluorescence” *Anal. Biochem.* *409*, 59-65 (2011).
31. S. Kelley, S. Boroda, K. Musier-Forsyth, **B.I. Kankia**, “HIV-integrase aptamer folds into a parallel quadruplex: A thermodynamic study” *Biophys. Chem.* *155*, 82-88 (2011).
32. S. Maiti, **B.I. Kankia**, I.Khutsishvili, L. Marky “Melting behavior and ligand binding of DNA intramolecular secondary structures.” *Biophys. Chem.* *159*, 162-71 (2011).
33. J. Johnson, R. Okyere, A. Joseph, K. Musier-Forsyth, **B. Kankia**, “Quadruplex formation as a molecular switch to turn on intrinsically fluorescent nucleotide analogs” *Nucleic Acids Res.* *41*, 220-28 (2013).
34. A. Taylor, A. Joseph, R. Okyere, Sh. Gogichaishvili, K. Musier-Forsyth, **B. Kankia**, “Isothermal quadruplex priming amplification for DNA-based diagnostics” *Biophys. Chem.* *171*, 1-8 (2013).
35. Sh. Gogichaishvili, J. Johnson, D. Gvarjaladze, L. Lomidze, **B. Kankia**, “Isothermal amplification of DNA using quadruplex primers with fluorescent pteridine base analogue 3-methyl isoxanthopterin” *Biopolymers* *101*, 583-590 (2014).
36. J. Mathias, R. Okyere, L. Lomidze, D. Gvarjaladze, K. Musier-Forsyth, **B. Kankia**, “Thermodynamic properties of quadruplex primers for highly versatile isothermal DNA amplification” *Biophys. Chem.* *185*, 14-18 (2014).
37. N. M. Adams, K. Wang, A. Caprioli, L. Thomas, **B. Kankia**, F. Haselton, D. Wright, “Quadruplex priming amplification for the detection of mRNA from surrogate patient samples” *Analyst* *139*, 1644-1652 (2014).
38. **B. Kankia**, “Tetrahelical Monomolecular Architecture of DNA: A New Building Block for Nanotechnology” *J. Phys. Chem. B* *118*, 6134-6140 (2014).
39. Sh. Gogichaishvili, L. Lomidze, **B. Kankia**, “Quadruplex priming amplification combined with nicking enzyme for diagnostics” *Anal. Biochem.* *466*, 44-48 (2014).
40. T. Partskhaladze, A. Taylor, D. Gvarjaladze, L. Lomidze, **B. Kankia**, “Exponential quadruplex priming amplification for DNA-based isothermal diagnostics ” *Biopolymers* *103*, 88-95 (2015).
41. **B. Kankia**, “Quadruplex-and-Mg²⁺ (QMC) connection of DNA” *Sci. Rep.* *5*, 12996, (2015).
42. **B. Kankia**, D. Gvarjaladze, A. Rabe, L. Lomidze, N. Metreveli, K. Musier-Forsyth, “Stable domain assembly of monomolecular DNA quadruplex: implications for DNA-based nanoswitches” *Biophys. J.* *110*, 2169-2175 (2016).
43. L. Lomidze, S. Kelley, S. Gogichaishvili, N. Metreveli, K. Musier-Forsyth, **B. Kankia**, “Sr²⁺ induces unusually stable d(GGGTGGGTGGGTGGG) quadruplex dimers” *Biopolymers* *105*, 811-818 (2016).
44. L. Lomidze, T. H. Williford, K. Musier-Forsyth, **B. Kankia**, “Isothermal amplification of long DNA segments by quadruplex priming amplification” *Analytical Methods* *10*, 2972 (2018).
45. **B. Kankia**, “Monomolecular tetrahelix of polyguanine with a strictly defined folding pattern” *Sci. Rep.* *8*, 12996 (2018).

46. C. Pease, G.E. Plum, **B. Kankia**, J.J. Kwiek, R. Sooryakumar, "On chip quadruplex priming amplification for quantitative isothermal diagnostics" *Biomed. Microdevices* 20, 56 (2018).
47. **B. Kankia**, "Stability Factors of the Parallel Quadruplexes: DNA versus RNA" *J. Phys. Chem. B* 123, 1060-1067 (2019).
48. **B. Kankia**, "Quadruplex-Based Reactions for Dynamic DNA Nanotechnology" *J. Phys. Chem. B* 124, 4263-4269 (2020).
49. **B. Kankia**, "Quadruplex- templated and catalyzed ligation of nucleic acids" *ChemBioChem* 22, 1261-67 (2021).
50. C. Harpster, E. Boyle, K. Musier-Forsyth, **B. Kankia** "HIV-1 genomic RNA U3 region forms a more stable quadruplex-hairpin structure than the corresponding U3-DNA sequence" *Biophys. Chem.* 272, 106567 (2021).
51. **B. Kankia**, "Quadruplex world" *Origin of Life and Evolution of Biospheres* 51, 273-286 (2021).
52. L. Lomidze, M. Yang, D. Khutsishvili, N. Metreveli, K. Musier-Forsyth, **B. Kankia**, "Structure of tetrahelical DNA homopolymers support quadruplex world hypothesis" *ACS Chemistry* 7, 4311-4316 (2022).
53. E. Boyle, L. Lomidze, K. Musier-Forsyth, **B. Kankia**, "A Chimeric DNA/RNA Antiparallel Quadruplex with Improved Stability" *ChemistryOpen* 11, e202100276 (2022).
54. **B. Kankia**, "Trinity of G-tetrads and origin of translation" *Biology Direct* 17, 12 (2022)
<https://doi.org/10.1186/s13062-022-00327-9>

PATENTS:

1. **B. I. Kankia**, "Isothermal Amplification of Nucleic Acid", US Application Serial No. 61/940,045, publication No. 20140051086.
2. **B. I. Kankia**, "Primers and Methods for Nucleic Acid Amplification Including Acute Inflammation" US Application Serial No. 13/579,486, publication No. 20120315642.
3. **B. I. Kankia**, "Primers and Methods for Nucleic Acid Amplification", European Application Serial No. 11745310.0, publication No. EP2536739.
4. **B. I. Kankia**, "Primers and Methods for Nucleic Acid Amplification", Canadian Application Publication No. 2,790,342, issued on October 1, 2019.
5. **B. I. Kankia**, "Isothermal Amplification of Nucleic Acid, and Library Preparation and Clone Generation in Sequencing", PCT/US2014/021165, pending.

BOOK CHAPTERS

1. **B. I. Kankiya**, S. N. Buckina, S. R. Valaeva & V. A. Buckin, "Ultrasonic Investigation of Solute-Solvent Interactions in Dilute Aqueous Solutions of Nucleic Bases", in *Ultrasound* 86, Bratislava, Czechoslovakia, 126-131 (1986).

2. **B. I. Kankia**, V. A. Buckin & Th. Funck, “Acoustical Study of EDTA-Metal (Magnesium, Calcium, Strontium & Barium) Complex Formation in Aqueous Solutions”, *Radiation Research* 6, 116-123 (1991).
3. **B. I. Kankia**, V. A. Buckin & Th. Funck, “Alteration of Apparent Volume and Apparent Adiabatic Compressibility During Interaction of Mg^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} with EDTA Aqueous Solutions”, *Radiation Research* 6, 124-131 (1991).
4. V. N. Belonenko, T. Chalikian, T. Funck, **B. Kankia** & A. P. Sarvazyan, “High Resolution Ultrasonic Measurements as a Tool for Studies on Biochemical Systems under Variation of Pressure”, in *High Pressure Research in Bioscience and Biothechnology*, K. Heremans, Ed., Leuven University Press, Leuven, 147-150 (1997).
5. V. N. Belonenko, E. Bunau, T. Chalikian, L. De Maeyer, T. Funck, **B. Kankia**, V. Nikolashev & A. P. Sarvazyan, “Measurements of the Compressibility of Small Fluid Samples As a Function of Pressure”, in *High Pressure Research in Bioscience and Biothechnology*, K. Heremans, Ed., Leuven University Press, Leuven, 150-153 (1997).
6. **B. Kankia**, “Quadruplex priming amplification (QPA) for nucleic acid diagnostics” in *RNA and DNA Diagnostics*, V.A. Erdmann, S.Jurga, J.Barciszewski, Ed. Springer, 281-295 (2015).

PUBLISHED MEETING PROCEEDINGS:

1. V. A. Buckin, S. V. Tshelikova, R. L. Kazaryan & **B. I. Kankiya**, “Acoustical Investigation of Ionic Atmosphere of Nucleic Acids in Aqueous Solutions”, in Proc. Int. Symp. *Structure of Liquids and Solutions*, Vezprem, Hungary, pp.12-13 (1987).
2. **B. I. Kankiya** & V. A. Buckin, “Ultrasonic Investigation of Hydration of Double-Stranded Polynucleotides”, in Proc. Int. Symp. *UBIOMED VIII*, Brno, Czechoslovakia, p. 20 (1989).
3. V. A. Buckin, L. De Maeyer, Th. Funck, E. Kudrjashov, F. Braginskaya, **B. I. Kankia** & L. A. Marky, “Application of Ultrasonic Velocity Technic for the Direct Measurements of the Hydration Changes that Results from the Interaction of Ligands to DNA”, *J. Biomed. Struct. and Dyn.* 10, p.021 (1993).
4. V. A. Buckin, L. De Maeyer, T. Funck, **B. I. Kankia** & L. A. Marky, “Hydration Effects in DNA-Magnesium Binding”, in Proc. *11th Int. Biophys. Cong.*, Budapest, Hungary, p.165 (1993).
5. V. Buckin, L. De Maeyer, T. Funck, E. Kudrjashov, F. Braginskaya, **B. I. Kankiya** & L. A. Marky, “Ultrasonic Velocity Measurements Are a New Method for Investigations of DNA-Ligand Interactions”, in Proc. *21th Int. Workshop on DNA-Drug Interactions*, Madrid, Spain, p.50 (1993).
6. V. Buckin, **B. I. Kankiya** & L. A. Marky, “Hydration Effects in the Ionic Atmosphere of Nucleic Acids”, *Prog. in Biophys. & Mol. Biol.* 65, A75 (1996).
7. G. M. Mrevlishvili, **B. I. Kankia**, T. J. Mdzinarashvili, N. O. Metreveli, M. M. Khvedelidze & T. Brelidze, “Calorimetric study of lipid-DNA interactions”, in Proc. *14th IUPAC Conf. on Chemical Thermodynamics*, Osaka, Japan, p. 376 (1996).
8. V. Buckin, **B. I. Kankiya**, V. Morozov & L. A. Marky, “What Are the Main Factors Determining the Structure of the Ionic Atmosphere of Nucleic Acids”, *Biophysical Journal* 70, p. A155 (1996).

9. S. Maiti, **B. I. Kankia** & L. A. Marky, "Interaction of Distamycin with DNA Oligomers Containing One A₃T₂ Binding Site: Contribution of Secondary Structure" in Proc. *14th Annual Gibbs Conference on Biothermodynamics*, Carbondale, Illinois, p.4.61 (2000).
10. S. Maiti, **B. I. Kankia** & L. A. Marky, "Interaction of Minor Groove Ligands to DNA Oligomers Containing One or Two AAATT/TTTAA Sites" in Proc. *220th American Chemical Society National Meeting*, Washington, DC, Phys. 286 (2000).
11. S. Maiti, **B. I. Kankia** & L. A. Marky, "Folding and Ligand Binding to DNA Oligonucleotides with Single and double Hairpin Loops", in Proc. *16th Annual Gibbs Conference on Biothermodynamics*, Carbondale, Illinois, p.15 (2002).

CONFERENCE PRESENTATIONS (ORAL):

1. **B. I. Kankiya**, S. V. Tshelikova, R. L. Kazaryan & V. A. Buckin, "Acoustical Investigation of Interactions of DNA with Mg²⁺", *7th International Symposium Spectroscopy of Biopolymers*, Kharkov, USSR (1988).
2. **B. I. Kankia** & L. A. Marky, "Hydration Effects Resulting from the Interaction of Mg²⁺ with DNA, RNA, DNA/RNA Undecamer Duplexes and their Component Single Strands", *42nd Biophysical Society Meeting*, USA (1998).
3. **B. I. Kankia** & L. A. Marky, "Differential Hydration Resulting from the Inclusion of W-C Base Pairs, Mismatches and Loops into DNA Duplexes", *43rd Biophysical Society Meeting*, USA (1999).
4. **B. I. Kankia** & L. A. Marky, "Thermodynamic Investigation of the Hydration Effects Accompanying the Binding of Mg²⁺ to Nucleic Acids", *13th Annual Gibbs Conference on Biothermodynamics*, USA (1999).
5. **B. I. Kankia** & L. A. Marky, "Formation of G-quadruplexes with Alkaline and Alkaline-earth Metal Ions: Folding and Hydration", *14th Annual Gibbs Conference on Biothermodynamics*, USA (2000).
6. **B. I. Kankia**, "Inner-sphere Complexes of Mg²⁺ with Poly(rA) and Delocalized Binding to Poly(dA)", *16th Annual Gibbs Conference on Biothermodynamics*, USA (2002).
7. **B. I. Kankia**, George Barany, Karin Musier-Forsyth "Unfolding of DNA Quadruplexes Induced by HIV-1 Nucleocapsid Protein", *5th International Retroviral NC Symposium*, USA (2005).
8. **B. I. Kankia**, "Thermodynamics of DNA quadruplexes" *3rd Forum of Georgian Scientists* Tbilisi, Georgia (2010).
9. **B. I. Kankia**, "Quadruplex-Based Technology for Isothermal Quadruplex Priming Amplification and Non-Enzymatic Detection", Bill and Melinda Gates Foundation Meeting, Vancouver, Canada 2011.
10. **B. I. Kankia**, "DNA quadruplexes in diagnostics" *4th Forum of Georgian Scientists* Tbilisi, Georgia (2011).
11. J. Johnson, R. Okyere, A. Taylor, A. Joseph, K. Musier-Forsyth, **B. Kankia**, "Quadruplex-based technology for nucleic acid amplification and detection" *56th Biophysical Society Meeting*, USA (2012)
12. **B. Kankia**, "Quadruplex-Based Technology for Isothermal Quadruplex Priming Amplification and Non-Enzymatic Detection", Bill and Melinda Gates Foundation Meeting, Seattle, USA, 2012.
13. **B. I. Kankia**, "DNA thermodynamics in Georgia" *5th Forum of Georgian Scientists* Batumi, Georgia (2012).

14. **B. Kankia**, “Quadruplex priming amplification for DNA diagnostics and isothermal clone generation”, Bill and Melinda Gates Foundation Meeting, Seattle, USA (2013).
15. **B. Kankia**, “Tetrahelical Monomolecular Architecture of DNA for biotechnological applications”, 1st Conference on Biomotors, Virus Assembly, and Nanotechnology Applications", Columbus, USA (2017).
16. **B. Kankia**, “Tetrahelical Monomolecular Architecture of DNA for biotechnological applications”, *31st Annual Gibbs Conference on Biothermodynamics*, USA (2017).
17. **B. Kankia**, “Quadruplex-based technologies for point-of-care DNA diagnostics”, 2nd Conference on Biomotors, Virus Assembly, and Nanotechnology Applications", Columbus, USA (2019).
18. **B. Kankia**, “The Quadruplex World Hypothesis” 8th International Meeting on Quadruplex Nucleic Acids, Marienbad, Czech Republic, 27 June – 1 July (2022).

CONFERENCE PRESENTATIONS (POSTER):

1. V. A. Buckin & **B. I. Kankia**, “Interaction Between Base and Ribose of Nucleosides in Aqueous Solutions”, *Structural Changes of Biopolymers in Solutions*, Tbilisi, USSR (1985).
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