Curriculum vitae

Annamária Tóth

Personal information

Date and place of birth: Szeged, 05 Aug 1997
Address (work): Dóm tér 7-8. H-6720 Szeged, Hungary
Email: toth.annamaria@chem.u-szeged.hu
Phone (work): +36 (62) 54-4435

Work and education

March 2026–current: Research assistant (Department of Molecular and Analytical Chemistry, University of Szeged)

2021–2025: PhD in Doctoral School of Chemistry, Department of Molecular and Analytical Chemistry, University of Szeged

Research topic: *Investigating the cysteine binding behaviour of AsIII selectivity and functional mechanism of the semimetal regulator ArsR proteins.*

Supervisor: Prof. Attila Jancsó and Prof. Béla Gyurcsik

2019–2021: MSc in Chemistry (Department of Inorganic and Analytical Chemistry, University of Szeged)

Thesis: *Ca^{2+}-and Mg^{2+}-binding affinity of the metal-chelator moieties of compounds designed for Ca^{2+} ion sensing*

Supervisor: Prof. Attila Jancsó

July 2020: Two-week internship (Department of Chemistry, Nuclear Power Plant of Paks)

Febr–June 2020: Project work (Department of Physical Chemistry and Materials Science, University of Szeged)

Thesis: Studying the reaction of carbamide and urease

2016–2019: BSc in Chemistry (Department of Inorganic and Analytical Chemistry, University of Szeged)

Thesis: *Conformational behavior of the CXXC peptide sequence motif in metal ion coordination: unexpected contradictions with Hg(II) ion*

Supervisors: Levente István Szekeres and Prof. Attila Jancsó

2012–2016: High school studies (SZTE Laboratory Grammar School and Elementary School)

Language skills

Mother language: *Hungarian*
Other languages:
English (B2, active)
German (B2, currently inactive)

Conferences

Oral presentation in Hungarian:

2024: *Az AfArsR fehérje funkcionális félfém-szelektivitásának szerkezeti tanulmányozása egy modellpeptiden keresztül* (57. Komplexkémiai Kollokvium, Szeged)

2023: *A félfémszabályzó AfArsR fehérje funkcionális szelektivitásának és derepressziós mechanizmusának vizsgálata* (56. Komplexkémiai Kollokvium, Szeged)

2022: *Az As(III) és Hg(II) kölcsönhatása az AfArsR fémszabályzó fehérje félfémkötő szakaszát modellező oligopeptiddel* (55. Komplexkémiai Kollokvium, Debrecen)

2021: *Ca -érzékelőkben potenciálisan alkalmazható módosított BAPTA származékok Ca - és Mg –kötő sajátságai* (54. Komplexkémiai Kollokvium, online)

Posters in English:

2024: *Molecular details of the metalloid recognition by the AfArsR protein* (17th European Biological Inorganic Chemistry Conference, Münster)

2023: *Investigation of the functional selectivity and derepression mechanism of the metalloid regulator AfArsR protein* (BioToP Conference, Vienna)

2022: *As(III) and Hg(II) interaction of an oligopeptide modelling the metal binding site of the metalloregulatory protein AfArsR* (16th European Biological Inorganic Chemistry Conference, Grenoble)

Teaching activities

Modern Separation-Technology Laboratory – Gel Electrophoresis (Hungarian): 2025, 2024

Inorganic Chemistry Laboratory (Hungarian): 2024, 2022, 2021

Quantitative Analytical Chemistry Laboratory (Hungarian): 2023

Biological Analytical Chemistry Laboratory (Hungarian): 2023

Classical Analytical Chemistry Laboratory (Hungarian): 2022

Co-supervision with Prof. Attila Jancsó: *2023-2024*:

BSc work of Timár Szilvássy: Production and purification of an ArsR metalloid regulator protein from the bacterium *Corynebacterium glutamicum*.

Chemical experiment show in Karolina High School, Szeged: 2019

Chemical experiment show to promote the chemistry in III. Béla High School, Baja: 2018

Research trips

2025.09.01. – 2026.02.28. (6 months) financially supported by the Hungarian State Eötvös Scholarship: *A study on a series of peptides to shed light on the role of the relative position of cysteines in As(III) binding.* (Lars Hemmingsen's lab, Department of Chemistry, Faculty of Science, University of Copenhagen, Denmark)

2025.05.05. – 2025.08.08. (3 months) financially supported by the Pannónia Scholarship: *Crystallization of various forms of AfArsR and CgArsR, two arsenic selective metalloregulatory proteins* (Leila Lo Leggio's lab, Department of Chemistry, Faculty of Science, University of Copenhagen, Denmark)

2024.06.11. – 2024.08.11. (2 months): *Studying the DNA binding and the functional selectivity of the ArsR proteins inside cells* (Atsushi Kawaguchi's lab, Department of Infection Biology, Faculty of Medical Science, University of Tsukuba, Japan)

2022 (for 10 days): *Participation in ^{199m}Hg PAC spectroscopic experiment series at CERN* (ISOLDE laboratory, CERN, Switzerland)

Publications

(1) Annamária Tóth, Bálint Hajdu, Zeyad H. Nafaee, Réka S. Gyimesi, Béla Gyurcsik, Éva Hunyadi-Gulyás, Joao G. Correia, Juliana Schell, Thanh T. Dang, Kohsuke Kato, Atsushi Kawaguchi, Lars Hemmingsen, Attila Jancsó: Assessing the functional selectivity of an arsenic sensing protein *in vitro* and *in vivo*. *Inorganic Chemistry Frontiers,* **2026**, accepted *ranking: Q1 (Scimago), IF (2024): 6.4*

(2) Bálint Hajdu, Annamária Tóth, Bettina Fazekas, Melinda Horvát, Kohsuke Kato, Atsushi Kawaguchi, Kyosuke Nagata, Attila Jancsó and Béla Gyurcsik: DNA recognition, cleavage, and toxic metal ion interaction of an artificial zinc finger protein inside *E. coli* cells. *Protein Science*, **2026**, *35* (6) e70599 *ranking: Q1 (Scimago), IF (2024): 5.2*

(3) Annamária Tóth, Kadosa Sajdik, Béla Gyurcsik, Zeyad H. Nafaee, Edit Wéber, Zoltán Kele, Niels Johan Christensen, Juliana Schell, Joao G. Correia, Kajsa G.V. Sigfridsson Clauss, Rebecca K. Pittkowski, Peter W. Thulstrup, Lars Hemmingsen and Attila Jancsó: From disorder to order – Turning on the signaling pathway in the As sensor protein AfArsR. *Journal of the American Chemical Society*, **2024**, *146* (25) 17009-17022 *ranking: Q1 (Scimago), IF (2024): 15.6*

(4) Niklas Fischer, Annamária Tóth, Attila Jancsó, Peter Thulstrup and Frederik Diness: Inducing α-helicity in peptides by silver coordination to cysteine. *Chemistry - A European Journal*, **2024**, e202304064 *ranking: Q1 (Scimago), IF (2024): 3.7*

(5) Zeyad H. Nafaee, Viktória Egyed, Attila Jancsó, Annamária Tóth, Adeleh Mokhles Gerami, Thanh Thien Dang, Juliana Heiniger-Schell, Lars Hemmingsen, Éva Hunyadi-Gulyás, Gábor Peintler and Béla Gyurcsik: Revisiting the hydrolysis of ampicillin catalyzed by Temoneira-1 β-lactamase, and the effect of Ni(II), Cd(II) and Hg(II). *Protein Science*, **2023**, *32*, e480 *ranking: Q1 (Scimago), IF (2023): 4.5*

Research skills

I have experience in the methods of studying complex equilibria, like pH-potentiometry and several spectroscopic methods (UV, CD, MS, 1D and 2D ^{1}H-NMR), and I also utilize the tools of molecular biology including DNA cloning, protein expression and various chromatographic purification methods as well as intracellular bio-assays (I-Block) to study biological macromolecules.