Curriculum Vitae – Dr. Péter Polcz

Address: Pázmány Péter Catholic University (PPCU),
Faculty of Information Technology and Bionics (FITB),
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Education

Ph.D. in Engineering Information Technology	FITB PPCU, Budapest	2021
M.Sc. in Engineering Information Technology	FITB PPCU, Budapest	2016
B.Sc. in Engineering Information Technology	FITB PPCU, Budapest	2014

Research Experience

János Bolyai Research Scholarship no. BO/00427/25 granted by the Hungarian Academy of Sciences entitled *"Analysis, observation, and control of bio-inspired nonlinear models"* at Faculty of Information Technology and Bionics, Pázmány Péter Catholic University — 2025 – (2028)

Primary investigator: of OTKA-PD grant no. 145902, entitled *"Computational analysis of nonlinear uncertain systems with applications"* at Faculty of Information Technology and Bionics, Pázmány Péter Catholic University — 2024 – (2026)

Researcher–developer (research fellow): Faculty of Information Technology and Bionics, Pázmány Péter Catholic University — 2020 –

Assistant research fellow: Systems and Control Lab, National Lab for Autonomous Systems, HUN-REN Institute for Computer Science and Control — 2020 –2022

Ph.D. student: Analysis and Control of Dynamical Systems Group, Roska Tamás Doctoral School of Sciences and Technology, FITB PPCU, Budapest.
Thesis advisor: Dr. Gábor Szederkényi DSc. — 2016 – 2021

M.Sc. student (assistant research fellow)**:** Analysis and Control of Dynamical Systems Group, FITB PPCU, Budapest.
Research advisor: Dr. Gábor Szederkényi DSc. — 2014 – 2016

B.Sc. student (undergraduate research assistant)**:** Distributed Events Analysis Research Group, Institute for Computer Science and Control, Hungarian Academy of Sciences, Budapest.
Research advisor: Dr. Csaba Benedek DSc. — 2013 – 2014

Research Interest

Computational analysis, filtering, and control of nonlinear uncertain dynamical systems using optimization ang computer algebra; nonlinear processes modeling.

Honors and Awards

Kopp-Skrabski Audience Award, scientific category: under 35 issued by Three Princes Three Princesses Foundation (Három Királyfi Három Királylány Alapítvány) and granted by Richter Gedeon Nyrt.	2022
Pro Scientia Gold Medal issued by the President of the Hungarian Academy of Sciences and the President of the National Student's Scientific Council.	2017
Innovation Award issued by Pro Progressio Foundation.	2017
National Scientific Students' Associations Conference (OTDK) 2nd prize, Section of Intelligent systems, methods and solutions 1. *An improved method for estimating the domain of attraction of uncertain nonlinear systems.*	2017
Fellowship granted by the Republic, Minister of Education.	2015
National Scientific Students' Associations Conference (OTDK) 1st prize, Section of Applied Informatics II. *3D virtual city reconstruction from LiDAR point clouds.*	2015

Publications Publications (MTMT)

SCI journal papers

[P1] L. Gerencsér, G. Michaletzky, J. Bokor, and P. Polcz. Notes on input design: from multi-sine design to data-driven procedures. *IEEE Control Systems Letters*, 8:1943–1948, 2024. ISSN: 2475-1456. DOI: 10.1109/lcsys.2024.3416072.

[P2] P. Polcz, T. Péni, and R. Tóth. Efficient implementation of Gaussian process-based predictive control by quadratic programming. *IET Control Theory & Applications*, 17(8):968–984, Feb. 2023. DOI: 10.1049/cth2.12430.

[P3] P. Polcz et al. Wastewater-based modeling, reconstruction, and prediction for COVID-19 outbreaks in Hungary caused by highly immune evasive variants. *Water Research*, 241:120098, May 2023. ISSN: 0043-1354. DOI: 10.1016/j.watres.2023.120098.

[P4] P. Polcz, B. Csutak, and G. Szederkényi. Reconstruction of epidemiological data in Hungary using stochastic model predictive control. *Applied Sciences*, 12(3):1113, 2022. ISSN: 2076-3417. DOI: 10.3390/app12031113.

[P5] P. Polcz and G. Szederkényi. Lyapunov function computation for autonomous systems with complex dynamic behavior. *European Journal of Control*:100619, 2022. ISSN: 0947-3580. DOI: 10.1016/j.ejcon.2022.100619.

[P6] P. Polcz, T. Péni, B. Kulcsár, and G. Szederkényi. Induced L2-gain computation for rational LPV systems using Finsler's lemma and minimal generators. *Systems & Control Letters*, 142:104738, 2020. ISSN: 0167-6911. DOI: 10.1016/j.sysconle.2020.104738.

[P7] P. Polcz, T. Péni, and G. Szederkényi. Computational method for estimating the domain of attraction of discrete-time uncertain rational systems. *European Journal of Control*, 49:68–83, 2019. ISSN: 0947-3580. DOI: 10.1016/j.ejcon.2018.12.004.

[P8] P. Polcz, T. Péni, and G. Szederkényi. Improved algorithm for computing the domain of attraction of rational nonlinear systems. *European Journal of Control*, 39:53–67, 2017. ISSN: 0947-3580. DOI: 10.1016/j.ejcon.2017.10.003.

[P9] P. Polcz, I. Z. Reguly, K. Tornai, J. Juhász, S. Pongor, A. Csikász-Nagy, and G. Szederkényi. Smart epidemic control: a hybrid model blending odes and agent-based simulations for optimal, real-world intervention planning. *PLOS Computational Biology*, 21(5):e1013028, May 2025. Ed. by A. F. Villaverde. ISSN: 1553-7358. DOI: 10.1371/journal.pcbi.1013028.

Other journal papers

[P10] N. Al-Hemeary, P. Polcz, and G. Szederkényi. Optimal solar panel area computation and temperature tracking for a CubeSat system using model predictive control. *SPIIRAS Proceedings*, 19(3):564–593, 2020. DOI: 10.15622/sp.2020.19.3.4.

[P11] P. Polcz, T. Péni, and G. Szederkényi. Reduced linear fractional representation of nonlinear systems for stability analysis. *IFAC-PapersOnLine*, 51(2):37–42, 2018. 9th Vienna International Conference on Mathematical Modelling. ISSN: 2405-8963. DOI: 10.1016/j.ifacol.2018.03.007.

[P12] P. Polcz and G. Szederkényi. Computational stability analysis of Lotka-Volterra systems. *Hungarian Journal of Industry and Chemistry*, 44(2):113–120, 2016. DOI: 10.1515/hjic-2016-0014.

[P13] P. Polcz, G. Szederkényi, and T. Péni. An improved method for estimating the domain of attraction of nonlinear systems containing rational functions. *Journal of Physics: Conference Series*, 659(1):012038, Nov. 2015. DOI: 10.1088/1742-6596/659/1/012038.

Conference papers

[P14] L. Gerencsér, G. Michaletzky, J. Bokor, and P. Polcz. Notes on input design: from multi-sine design to data-driven procedures. In: *2019 IEEE 58th Conference on Decision and Control (CDC)*. Piscataway (NJ), USA, Dec. 2024, 1943–1948.

[P15] P. Polcz, K. Schäffer, and M. Koller. Posture estimation for a high degree of freedom anthropomorphic tendon-based hand model – a simulation experiment. In: *2024 European Control Conference (ECC)*. IEEE, June 2024, 591–596. DOI: 10.23919/ecc64448.2024.10590845.

[P16] B. Csutak, P. Polcz, and G. Szederkényi. Model-based epidemic data reconstruction using feedback linearization. In: *2022 International Conference on Electrical, Computer and Energy Technologies (ICECET)*. July 2022, 1–6. DOI: 10.1109/ICECET55527.2022.9873061.

[P17] B. Csutak, P. Polcz, and G. Szederkényi. Computation of COVID-19 epidemiological data in Hungary using dynamic model inversion. In: *2021 IEEE 15th International Symposium on Applied Computational Intelligence and Informatics (SACI)*. May 2021, 91–96. DOI: 10.1109/SACI51354.2021.9465563.

[P18] P. Polcz and G. Szederkényi. Lyapunov function computation for nonlinear systems through dynamical embedding – A case study. In: *2021 European Control Conference (ECC)*. 2021, 1869–1874. DOI: 10.23919/ECC54610.2021.9655082.

[P19] P. Polcz, B. Kulcsár, T. Péni, and G. Szederkényi. Passivity analysis of rational LPV systems using Finsler's lemma. In: *2019 IEEE 58th Conference on Decision and Control (CDC)*. Nice, France, Dec. 2019, 3793–3798. DOI: 10.1109/CDC40024.2019.9029877.

[P20] P. Polcz, G. Szederkényi, and K. M. Hangos. Computational stability analysis of an uncertain bioreactor model. In: *13th International Symposium on Stability, Vibration, and Control of Machines and Structures - SVCS 2016, June 16-18, Budapest, Hungary*. 2016, 21–32.

[P21] P. Polcz, G. Szederkényi, and B. Kulcsár. Computation of rational parameter dependent Lyapunov functions for LPV systems. In: *Swedish Control Conference (Reglermöte) 2018*. 2018. DOI: 10.29007/9m7r.