CV of Prof. Dr. Dmitry A. Zaitsev

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Principal Theoretical Results:

- Theory of linear system clans, their simultaneous and parallel-sequential composition
- Theory of Infinite Petri Nets with regular structure (linear, square, hypercube)
- Sleptsov net computing
- Explicit construction of small Universal Sleptsov/Petri Nets
- Generalized neighbourhood for cellular automata
- Compositional Analysis of Petri Nets based on Decomposition of Petri Net into Functional Subnets
- Functional equivalence and equivalent transformationsof timed Petri nets
- Timed Petri nets with multi-channel transitions, their state equation and partial invariants
- Synthesis of Continuous (fuzzy) Logic function given by table

Principal Scientific-Practical Results:

- ParAd – software system for solving big sparse Diophantine systems on parallel and distributed architecture via clan composition
- Plug-in modules for Petri net modelling system Tina: Deborah–decomposition into clans, Adriana and ParAd – compositional computing Petri net invariants
- Petri net models of networking protocols:TCP, BGP, IOTP, ECMA
- Software generators of Petri net models of grids: square, hypercube, hypertorus
- Colored Petri net models of networks: Ethernet, IP, MPLS, Bluetooth, PBB, E6
- Stack of networking protocols E6 and its implementation in Linux kerne
- Software systems: Opera-Topaz – Petri net based production control and management, Nevod – Petri net modeling systemfor embedded applications, Sergo – editor of electrical circuits

Education:

- 1981-1986 Donetsk Polytechnic Institute (DPI), Ukraine, Applied Mathematics, MS.
- 1988-1991 post graduate course, DPI, Computer Science
- 1991 Academic Council of Kiev Cybernetics Institute Ac.Sci. Ukraine, Ph.D., Automated Control
- 2006 Academic Council of Odessa National Academy of Telecommunications (ONAT), Ukraine, Dr.Sci. (HDR), Telecommunication Systems and Networks

Training courses:

- 1986 System Programmer of RSX11M (DEC), LIMTU, St.Petersburg
- 1994 Organisation of Business in HiTech, RPI (USA) in Kiev
- 1995 Internet and Web Technology, DEC in Apatity, Russia
- 2002 Administration of Modern OS and DBMS, DIIT, Dnepropetrovsk, Ukraine

Jobs:

- 1986-1996 DPI, Department of Applied Mathematics and Informatics (AMI): 1986-1992 assistant professor, 1992-1996 associate professor; chief programmer in software development projects; system programmer; computer network administrator

- 1997-1998 Surgut State University, Department of Computer Science and Informatics, associate professor; chief of Network Technology Laboratory
- 1999-2003 Information and Computer Centre of Odessa Railway, leader engineer
- 2002-2006 ONAT, Department of Communication Networks, associate professor
- 2006-2009 Professor
- 2009-2019 International Humanitarian University, Department of Computer Engineering, professor
- 2014-2019 Vistula University, Warsaw, Department of Computer Science, professor
- 2019- Odessa State Environmental University, department of Information Technology, professor
- 2020- Fundación Centro de Supercomputación de Castilla y León, Senior Research Affiliate
- 2021- University of Information Technology and Management in Rzeszów, Poland, professor

Visiting Jobs:

- March 2005 University Paris-Dauphine, invite professor
- July-August 2015 Technical University of Dortmund, visiting professor, DAAD fellowship
- Autumn 2017 Innovative Computing Laboratory, University of Tennessee, USA, Visiting Professor, Fulbright Scholarship
- July 2018 Eindhoven University of Technology, Netherlands, Visiting Professor
- January 2019 Barcelona Supercomputing Center, Visiting Professor (Erasmus+ Scholarship)
- April-July 2022 Johannes Kepler University Linz, Austria, Institute of Telecooperation, visiting professor, JESH fellowship
- August 2022 – November 2023 I3S Laboratoire d'Informatique, Signaux et Systèmes de Sophia Antipolis, Université Côte d'Azur, Nice, France, visiting professor
- November 2023- Software Engineering Group, Technical University of Darmstadt, Visiting Professor

Supervising and mentoring activities:

- 2 Ph.D. students
- 28 Ms. students
- 12 Bc. Students

Editing and reviewing:

- Editor of International Journal of Parallel, Emergent and Distributed Systems, Teylor&Fransis since 2020
- Reviewer of: AMS Mathematical Reviews; Information Sciences; Fundamenta Informatica; Peer-to-Peer Networking and Applications; Journal of Automata, Languages, and Combinatorics; Evolving Systems; IEEE Access; IEEE Transactions on Systems, Man and Cybernetics: Systems; IEEE Transactions on Cybernetics; IMA Journal of Mathematical Control and Information.

Funding received:

- Short Term Scientific Mission, EU COST Action CA 16227: Investigation and Mathematical Analysis of Avant-Garde Disease Control Via Mosquito Nano- Tech Repellents, May 2021
- "Solving linear Diophantine systems via composition of their clans" – Fullbright scholarship, 2017
- "Security of model-driven software development" – DAAD fellowship, 2015
- "Analysis of computational grids efficiency via Colored Petri Nets" – Austria-Ukraine cooperation grant, 2013-2014
- "Production control with Petri nets" - China-Ukraine cooperation grant, 2011-2012
- "Developing New Addressing Systems for World-Wide Networks (E6)" – Ukraine state grant, 2008-2009
- "Verification of Complex Networking Protocols" – grant NATO ICS.NUKR.CLG 982698, 2007-2008
- "Simulating Backbone MPLS Networks" – Ukrtelekom corporation, 2007-2008

Recommendations:

- *https://www.linkedin.com/in/dmitry-a-zaitsev*

Most significant publications:

Theory of clans:

Zaitsev D.A. Clans of Petri Nets: Verification of protocols and performance evaluation of networks, LAP LAMBERT Academic Publishing, 2013, 292 p.

Dmitry Zaitsev, Stanimire Tomov, Jack Dongarra. Solving Linear Diophantine Systems on Parallel Architectures, IEEE Transactions on Parallel and Distributed Systems, 30(5), 2019, 1158-1169.

Zaitsev D.A. Sequential composition of linear systems' clans, Information Sciences, 363, 2016, 292-307.

Zaitsev D.A. Compositional analysis of Petri nets, Cybernetics and Systems Analysis, 42(1), 2006, 126-136.

Theory of infinite Petri nets:

Dmitry A. Zaitsev, Tatiana R. Shmeleva and Jan Friso Groote, Verification of Hypertorus Communication Grids by Infinite Petri Nets and Process Algebra, IEEE/CAA Journal of Automatica Sinica, 6(3), 2019, 733-742.

Dmitry A. Zaitsev, Ivan D. Zaitsev and Tatiana R. Shmeleva. Infinite Petri Nets: Part 2, Modeling Triangular, Hexagonal, Hypercube and Hypertorus Structures, Complex Systems, 26(4), 2017, 341-371.

Dmitry A. Zaitsev, Ivan D. Zaitsev and Tatiana R. Shmeleva. Infinite Petri Nets: Part 1, Modeling Square Grid Structures, Complex Systems, 26(2), 2017, 157-195.

Zaitsev D.A., Shmeleva T.R. Verification of hypercube communication structures via parametric Petri nets, Cybernetics and Systems Analysis, 46(1), 2010, 105-114.

Sleptsov net computing:

Sleptsov Net Computing Resolves Modern Supercomputing Problems, The April 21, 2023, edition of ACM TechNews.

Dmitry A. Zaitsev, Strong Sleptsov nets are Turing complete, Information Sciences, 621, 2023, 172-182.

Zaitsev D.A. Sleptsov Nets Run Fast, IEEE Transactions on Systems, Man, and Cybernetics: Systems, 46(5), 2016, 682-693.

Zaitsev D.A. Toward the Minimal Universal Petri Net, IEEE Transactions on Systems, Man, and Cybernetics: Systems, 44(1), 2014, 47-58.

Miscellaneous:

Dmitry A. Zaitsev, Tatiana R. Shmeleva, Zeyu Zhou & Ding Liu, Verification of cryptocurrency consensus protocols: reenterable colored Petri net model design, International Journal of Parallel, Emergent and Distributed Systems, 2023, Published online: 24 Oct 2023.

Zaitsev D.A. A generalized neighborhood for cellular automata, Theoretical Computer Science, 666, 2017, 21-35.

Zaitsev D.A., Shmeleva T.R., Retschitzegger W., Pröll B. Security of grid structures under disguised traffic attacks, Cluster Computing, 19(3), 2016, 1183-1200.

Zaitsev D.A. Switched LAN simulation by colored Petri nets, Mathematics and Computers in Simulation, 65(3), 2004, 245-249.

Zaitsev D.A., Sarbei V.G., Sleptsov A.I., Synthesis of continuous-valued logic functions defined in tabular form, Cybernetics and Systems Analysis, 34(2), 1998, 190-195.

Zaitsev D.A., Sleptsov A.I. State equations and equivalent transformations for timed Petri nets, Cybernetics and Systems Analysis, 33(5), 1997, 659-672.

Dmitry A. Zaitsev, Peyman Ghaffari, Virginia Sanz Sanchez. Modeling Ebola Virus Dynamics by Colored Petri Nets, IOS Press, Frontiers in Artificial Intelligence and Applications, Volume 345: Proceedings of CECNet 2021, 707–715.

Zaitsev D.A., Kharsun M.A. Implementing Stack E6 via OS Linux Sockets, Journal of Advanced Computer Science and Technology, 1(3), 2012, 116-133.