CURRICULUM VITAE

Dr. MICHAEL (MISHA) CHERTKOV
Graduate Inter-Disciplinary Program (GIDP) in Applied Mathematics, Chair,
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FIELDS OF INTEREST:

Applied Mathematics, Theoretical Physics, Data Science, AI & Machine Learning, Energy Systems, Hydrodynamics, Control and Optimization, Viral and Social Epidemiology

EDUCATION

1996 Ph.D. Physics, Weizmann Institute of Science, Israel (advisor: G. Falkovich)
1990 M.Sc. Physics, Novosibirsk State University, Russia (advisor: A. Patashinskii)

EMPLOYMENT

2019- Chair of the Graduate Inter-Disciplinary Program (GIDP) in Applied Mathematics, Professor of Mathematics, University of Arizona, Tucson
2002-2019 Technical Staff Member, Theoretical Division, Los Alamos NL
1999-2001 J.R. Oppenheimer Fellow, Theoretical Division, Los Alamos NL
1996-99 R.H. Dicke Fellow, Department of Physics, Princeton University
1993-96 Research Assistant, Weizmann Institute of Science
1990-92 Junior Researcher, Budker Institute, Novosibirsk

TEACHING AT U of Arizona

2025 **Mathematics of Generative AI** (Spring, Math 496T)
2022,24 Topics in Applied Math (Math 577) at UArizona on **Inference, Learning and Optimization with Graphs and Networks**
2020 Special mini-course on **Applied Mathematics for Physics Informed AI & Machine Learning** (6 lectures), Flatiron Institute
2019- Leading upgrade of the core courses (six) of the Applied Mathematics GIDP at UArizona, teaching two of the core courses of the program (581a/fall/3 credits & 581b/spring/3 credits): **Principles and Methods of Applied Mathematics**

AWARDS, ADJUNCT AFFILIATIONS, SERVICE and HONORS

2025 Scholar in **Faculty Mini Sabbatical** Program at Lawrence Livermore National Laboratory 08/18-10/18/2025

2025-27 **Humboldt Research Award**
2025- Member of the Editorial Board of **Physical Review X Energy**
2022 American Association for the Advancement of Science (AAAS) Fellow
2019-22 Member of the **Power Systems Computational Conference** (PSCC) Committee (Editorial Board)
2019-20 Editor of **Proceedings of IEEE**, Special Issue on "Integrated Energy Systems"
2018-19 Visiting Professor at the Universita di Torino (Italy) for the course "Introduction to data analysis for Natural and Social sciences"
2018 LANL 2017th Postdoc Distinguished Mentor Award
2017-19 Senior/Guest Editor of **IEEE Transactions on Control of Network Systems** (CONES) for the special issue on "Analysis Control and Optimization in Energy Systems"
2016-17 Adjunct Professor, Industrial & Operations Engineering, University of Michigan, Ann Arbor
2015-19 Adjunct Professor, Skoltech (Moscow, Russia)
2015 Senior Member of IEEE
2014- Member of the Editorial Board of **Scientific Reports** (Nature Group)
2013-19 Associate Editor of **Transactions on Control of Network Systems** (CONES)
2012-15 Founding Faculty Fellow in charge for Energy Programs at Skoltech (Moscow, Russia [consulting])
2011 Viisiting Scholar (Princeton University, EECS)
2011 American Physical Society (APS) Fellow
2011 Visiting Scholar (Landau Institute and FizTech, Russia)
2011 TCP Member for the IEEE SmartGridComm, Brussels 10/2011
2011 TCP Member for Foundations of Dependable and Secure Cyber-Physical Systems, Chicago 04/2011
2010 TCP Member for the IEEE SmartGridComm, NIST 10/2010
2010-18 Member of the Editorial board of the **Journal of Statistical Mechanics** (JSTAT)
2010 Visiting Scholar (Aston U, UK)
2008- Visiting Researcher (NM Consortium)
2007 Weston Visiting Professor (Weizmann Institute)
2007 Visiting Scholar (Joint Theory Institute at U of Chicago and ANL)
2004 CNRS Visiting Scholar (Nonlinear Institute, Nice)
1999 J.R. Oppenheimer Fellowship at LANL
1996-99 Consultant (Bell Laboratories, Lucent Technologies)
1996 R.H. Dicke Fellowship at Princeton (Physics Department)
1996 Prize of the Feinberg Graduate School
1995 Prize of the Charles Clore Israel Foundation

WORKSHOPS and CONFERENCES co-ORGANIZED (only latest are shown: 2019–)

01/2025 Sixth Grid Science Winter School & Conference (Santa Fe/LANL, NM)
12/2024 Special Session at the 63rd IEEE Conference on Decision and Control, Modeling, Control and Decisions for Natural Gas Systems and Components (Milan, Italy)

10/2024 Fifth workshop on Physics Informed Machine Learning (Los Alamos/LANL, NM)
01/2023 Fifth Grid Science Winter School & Conference (Santa Fe/LANL, NM)
08/2022 Arizona-Los Alamos Days (Los Alamos, NM)
05/2022 Fourth workshop on Physics Informed Machine Learning and CNLS Annual Conference (Santa Fe/LANL, NM)
12/2021 Workshop at the 60th IEEE Conference on Decision and Control, Uncertainty Management in Power System Dynamics (Austin, TX, virtual)
06/2021 Power Tech 2021, Special Session on Integrated Distributed Energy Networks (Madrid, Spain, virtual)
05/2021 Arizona-Los Alamos Days (Tucson, AZ, virtual)
01/2021 Fourth Grid Science Winter School & Conference (Santa Fe/LANL, NM, virtual)
05/2020 Arizona-Los Alamos Days (Tucson, AZ, virtual)
01/2020 Machine Learning & Physics (Moscow/HSU-Skoltech, Russia)
01/2020 Third workshop on Physics Informed Machine Learning (Santa Fe/LANL, NM)
04/2019 Arizona-Los Alamos Days (Tucson/UA, AZ)
01/2019 Third Grid Science Winter School & Conference (Santa Fe/LANL, NM)

ADVISED POSTDOCS and FELLOWS AT LANL AND U of Arizona

2019-2024 Laurent Pagnier (Research Assistant Professor, UArizona) - *Machine Learning, Power Systems*
2019-2021 Francesco Concetti (Postdoc, Bazel) - *Machine Learning, Theoretical Physics*
2019-2023 Colin Clark (Staff Member, Rincon Research) - *Applied Mathematics, Graduate Education*
2018-2019 Amy Lowell (Staff Member, LANL/T-2) - *Nuclear Physics, Machine Learning*
2018-2019 Arvind Mohan (Staff Member, LANL/CCS-3) - *Hydrodynamics, Deep Learning*
2017-2019 David Metiéver (Staff Member, INRAE, Montpellier) - *Statistical Physics, Energy Systems, Machine Learning*
2017-2018 Line Roald (Assistant Professor at U of Wisconsin-Madisson) -*Power Engineering, Stochastic Optimization*
2016-2018 Yury Maximov (Staff Member, LANL/T-5) - *Mathematical Optimization, Machine Learning*
2016-2017 Se-Young Yun (Assistant Professor at KAIST) - *Mathematical Modeling of Networks, Machine Learning*
2015-2018 Deepjyoti Deka (Staff Member, LANL/T-5) - *Power Systems, Computer Science*
2015-2017 Andrey Lokhov (Staff Member, LANL/T-5) - *Statistical Physics, Machine Learning*
2014-2016 Sidhant Misra (Staff Member, LANL/T-5) - *Applied Probability & Energy Systems*
2014-2016 Anatoly Zlotnik (Staff Member, LANL/T-5) - *Control Theory & Energy Systems*
2014-2016 Marc Vuffray (Staff Member, LANL/T-4) - *Information Theory & Energy Systems*
2009-2011 Shrinivas Kudekar (Staff Member at Qualcomm Research) - *Information/Coding Theory*

2009-2010 Konstantin Turitsyn (Associate Professor at MIT/ME, Staff Member at D.E. Shaw) - *Statistical Physics, Fluid Mechanics, Power Grids*
2008-2011 Jason Johnson (Staff Member at Numerica) - *Computer Science, Machine Learning*
2008-2010 Lenka Zdeborova (Professor, EPFL) - *Statistical Physics, Optimization*
2006-2008 Nandakishore Santhi (Staff Member, LANL/CCS-3)- *Information/Coding Theory*
2006-2008 Razvan Teodorescu (Associate Professor at University of South Florida) - *Mathematical/Statistical Physics*
2005-2007 Colm Connaughton (Associate Professor at U of Warwick, UK) - *Statistical Physics, Turbulence*
2004-2006 Misha Stepanov (Assosiate Professor at UA, Tucson) - *Statistical Physics, Theory of Error-Correction*
2002-2004 Yeo-Jin Chung (Researcher in S. Korea National Laboratory) - *Applied Mathematics, Fiber Optics Communications*
2001-2004 Avner Peleg (Researcher, Hebrew University of Jerusalem) - *Applied Mathematics, Fiber Optics Communications*

STUDENTS ADVISED at UArizona (Ph.D.)

2020-	Amir Mohammad Esmaieeli Sikaroudi, (Ph.D., CS @ UA, co-advised)
2021-	Ayrton Pablo Almada Jimenez, (Ph.D., Applied Math GIDP, UA)
2022-	Marium Yousuf, (Ph.D., Applied Math GIDP, UA, co-advised)
2021-24	Hamidreza Behjoo (Ph.D., Applied Math GIDP, UA)
2020-	Robert Ferrando (Ph.D., Applied Math GIDP, UA)
2019-	Criston Hyett (Ph.D., Applied Math GIDP, UA)
2019-23	Michael Woodward (Ph.D., Applied Math GIDP, UA)

RESEARCH GRANTS: PI or co-PI at UArizona, 2019-

2023-25 **IGE: Integrating Data Science into the Applied Mathematics PhD: Generalized Skills for Non-Academic Careers**, (PI, NSF/IGE), 500K
2023-25 **Collaborative Research: AMPS: Rare Events in Power Systems: Novel Mathematics, Statistics and Algorithms**, (PI, NSF/AMPS), 150K
2023-25 **Physics Informed Machine Learning of Turbulence**, (PI, DOE/LANL, subcontract) $\approx 320K\$$
2022-24 **Reinforcement Learning for Particle Accelerators**, (PI, DOE/LANL, subcontract) $\approx 240K\$$
2020-23 **Risk Aware Power System Control, Dispatch and Market Incentives** , (UArizona PI, DOE/ARPA-E, lead by Columbia U, with participation of NYU)$\approx 2M\$$
2020-25 **Research & Training Grant: Applied Mathematics and Statistics for Data-Driven Discovery**, (co-PI, NSF)$\approx 2.2M\$$
2020-22 **RAPID: Infer and Control Global Spread of Corona-Virus with Graphical Models** , (PI, NSF, Rapid Award)$\approx 100K\$$
2019-21 **Machine Lerning for Turbulence**, (PI, DOE/LANL, subcontract) $\approx 800K\$$

PI at LANL 2001-2019, all competitive – External to LANL: 17.9 M$ (15M$ DOE/OE, 0.93 M$ NSF, 1.44 M$ DTRA, 0.54 M$ U of California, Office of President) + LANL LDRD: 13 M$)
2019-2021 **MELT: MachinE Learning for Turbulence** (LDRD/DR at LANL)$\approx 5M$\$
2018 **Machine Learning Emulators for Turbulence** (LDRD/ER at LANL)$\approx 250K$\$
2016-2018 DOE/GMLC 2.0: **Emergency Monitoring and controls through new technologies and analytics** (LANL leading, PNNL & MIT participate) $\approx 1M$\$/year
2016-2018 DOE/GMLC 2.0: **Advanced Machine Learning for Synchrophasor Technology** (LANL leading, PNNL, LBNL and Columbia U participate)$\approx 1M$\$/year
2016-2018 DOE/GMLC 1.4.9: **Integrated Multi Scale Data Analytics and Machine Learning for the Grid** (LBNL leading, co-PI, LANL PI) $\approx 1M$\$/year
2014-2016 **Grid Science, DOE/OE** (programmatic, co-PI with S. Backhaus) $\approx 2M$\$/year
2013 **Optimization and Control of Smart Grids** (LDRD/ER at LANL) $\approx 200K$
2012-2015 **Power Grid Spectroscopy** (NSF via NM Consortium ECCS: Collaborative Research with MIT & Urbana)$\approx 130K$\$/year
2012-2014 **Combinatorial Approaches to Graphical Models: Theory & Applications** (LDRD/ER at LANL)$\approx 350K$\$/year
2011-2015 **Prediction and Control of Network Cascade: Example of Power Grid** (DTRA)$\approx 360K$\$/year
2010-2012 **Optimization and Control Theory for Smart Grids** (LDRD/DR at LANL)$\approx 1.65M$\$/year
2009-2011 **Coding, Detection, and Inference in Multiple Dimensions**, (UCOP LANL-UCSD) $\approx 180K$\$/year
2008-2010 **Harnessing Statistical Physics for Computing and Communication** (NSF via NM Consortium, EMT/MISC: Collaborative Research with MIT & Cornell)$\approx 180K$\$/year
2007-2009 **Physics of Algorithms** (LDRD/DR at LANL)$\approx 1.5M$\$/year
2006-2008 **Novel physics inspired approach to error-correction** (LDRD/ER at LANL) $\approx 300K$\$/year
2006-2007 **Prediction of Mixing Induced by Rayleigh-Taylor Instability** (WSR at LANL)$\approx 200K$\$/year
2001-2003 **Statistical Physics of Fiber Optics Communications** (LDRD/ER at LANL) $\approx 190K$\$/year

CITATION DATA
Google Scholar – Citations: **13754** ; h-index: **57**; i-10 index: **174** [as of 04/27/2025]

LIST OF PUBLICATIONS: `https://orcid.org/0000-0002-6758-515X`

LIVING BOOKS `https://sites.google.com/site/mchertkov/research/living-books`
⊗ InferLO: Inference, Learning & Optimization with Graphical Models.
⊗ Principles and Methods of Applied Mathematics (World Scientific 2025).
⊗ Mathematics of Generative AI.