Yuriy Mishchenko, PhD

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Professional

2015-current	**Toros University, Mersin, Turkey** Associate Professor, Department of Computer and Software Engineering.
2015	**Doçentlik (ÜAK)**
2011-2015	**Toros University, Mersin, Turkey** Assistant Professor, Department of Computer and Software Engineering.
2008-2010	**Columbia University, New York, NY, USA** Postdoctoral Fellow, Center for Theoretical Neuroscience and Department of Statistics (with Prof. Dr. L. Paninski).
2006-2008	**Howard Hughes Medical Institute, Janelia Farm Research Campus, Ashburn, VA, USA** Research Associate, Bioinformatics and Computational Neuroscience Group (with Prof. Dr. D. Chklovskii).
2005-2006	**Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, USA** Research Associate, Bioinformatics and Computational Neuroscience Group (with Prof. Dr. D. Chklovskii).
2003-2004	**North Carolina State University, Raleigh, NC, USA** Research Assistant, Department of Physics (advisor Prof. Dr. C.-R. Ji).
2003	**Jefferson Laboratory, Newport News, VA, USA** Research Assistant (advisor Prof. Dr. A. Radyushkin and Prof. Dr. C.-R. Ji).
2000-2003	**North Carolina State University, Raleigh, NC, USA** Teaching Assistant, Department of Physics.

Education

2004	**North Carolina State University, Raleigh, NC, USA (Summa Cum Laude)** Ph.D. Theoretical Physics, Advisor Prof. Dr. C.-R. Ji Dissertation title: "Applications of Canonical Transformations and Nontrivial Vacuum Solutions to Flavor Mixing and Critical Phenomena in Quantum Field Theory."
2000	**National Kiev University of Taras Shevchenko, Kiev, Ukraine (Summa Cum Laude)** M.S. Theoretical Physics, Advisor Prof. Dr. I. Simenog Thesis title: "Nonperturbative Mass Renormalization in 2+1 Scalar Yukawa Model."
1999	**National Kiev University of Taras Shevchenko, Kiev, Ukraine (Summa Cum Laude)** B.S. Theoretical Physics, Advisor Prof. Dr. I. Simenog Thesis title: "Precision Quantum Mechanical Variational Calculations of Three-Body Coulomb System ($dt\mu$)."

Honors and Awards

2015	2nd Place Best Project Award, Signal Processing and Applications Competition, 23rd IEEE Signal Processing and Communications Applications Congress SIU-2015, Malatya, Turkey.
2014	5th Place Best Project Award, 4th Regional Project Competition of East Mediterranean Universities, Iskenderum, Turkey.
2013	The Science Academy Young Investigator Award (BAGEP), Istanbul, Turkey.
2010	Madison Who's Who Registry of Executives and Professionals, New York, USA.

2002 SURA/JLab Graduate Fellowship Award of the South-Eastern Universities Research Association and Jefferson Lab (SURA/JLAB), Newport News, USA.

Research Grants

"Development of more efficient noninvazive brain-machine interfaces", TUBITAK ARDEB 1001 Grant Number 113E611, *Principal Investigator*, 2014-2017 (Turkey).

"Software development laboratory", Toros University BAP Grant Number TUBAP145003, *Researcher*, 2014-2015, Turkey.

"Founding of the Noninvazive Brain-Machine Interfaces Research Laboratory at the Faculty of Engineering of Toros University", Toros University BAP Grant Number TUBAP135001, *Principal Investigator*, 2013-2014 (Turkey).

"Constraining parameters of Dark Matter particles from observations of Dark Matter in high-speed collision galaxy clusters", APS ITGAP, *Principal Co-Investigator*, 2013-2014 (USA).

"Measurements of the efficiency of solar panels and electronic devices", *Researcher*, Toros University BAP Grant Number TUBAP135002, 2013-2014, Turkey.

Taught Undergraduate and Graduate Courses

Databases (undergrad)
Advanced Databases (undergrad)
Information Systems Security (undergrad)
Optimization Methods (undergrad)
C/C++ Programming (undergrad)
Java Programming (undergrad)
MATLAB for Engineers (undergrad)
Computer Skills (undergrad)
Physics I (undergrad)
Physics II (undergrad)
Methods in Convex Optimization (grad)
Big Data Applications in Business (grad)
Artificial Intelligence and Machine Learning (grad)
Algorithms and Data Structures (grad)
Internet Programming (grad)

Advised Theses and Dissertations

Hilmi YANAR, "A macroscopic dynamical model of the electroencephalographic brain activity", Ph.D. Thesis, Mersin University, ongoing (Co-Advisor).

Mustafa COMERT, "Designing biometric identification interface with palm vein structure on embedded system", M.S. Thesis, Mersin University, 2015 (Jury member).

Huseyin YANIK, "Development of a software platform together with a user interface to analyze ECG signals using signal processing techniques", M.S. Thesis, Mersin University, 2015 (Jury member).

Erhan ONEL, "Information management systems and emotional intelligence in information technology", M.S. Thesis, Toros University, 2014 (Advisor).

Umit Akin USLU, "Designing microcontroller based automatic two axis sun tracking system by using maximum power point tracking algorithms", M.S. Thesis, Mersin University, 2012 (Jury member).

Performed Administrative Duties

2012-current Member of the Steering Committee of the Faculty of Engineering, Toros University.

2012-2015	Department head of the Department of Computer Engineering, Faculty of Engineering, Toros University.
2012-2013	Department head of the Department of Computer-Software Engineering, Faculty of Engineering, Toros University.

Patents

"Systems and Methods for Exchanging Information in a Large Group", US8335827 B2 (US 12/480,325), Dec 18 2012.

Society Memberships

American Physical Society, Society for Neuroscience, Phi Kappa Phi Honor Society.

Languages

English (fluent), Ukrainian (native), Russian (native), Turkish (advanced).

Publications

Journal Publications

1. Akirmak O. O., Tatar C., Altun Z. G., Mishchenko Y. (2016) Design of a sEMG controlled robotic hand prosthesis. (Submitted)
2. Mishchenko Y., Kaya M. (2016) A system for continuous monitoring of an operator's attention state using an EEG-based Brain-Computer Interface. (Submitted)
3. Mishchenko Y., Ji C.-R. (2016) Dark matter phenomenology of high speed galaxy cluster collisions. (Submitted, arXiv:1511.00597)
4. Mishchenko Y. (2016) Consistent estimation of complete neuronal connectivity in large neuronal populations using sparse "shotgun" neuronal activity sampling. (Submitted, BioRxiv doi:10.1101/032409)
5. Mishchenko Y. (2015) Variability in cellular gene expression profiles and homeostatic regulation. BioRxiv doi: 10.1101/021048.
6. Mishchenko Y. (2015) A function for fast computation of large discrete Euclidean distance transforms in three or more dimensions in Matlab. Signal, Image and Video Processing, 9, 19.
7. Mishchenko Y. (2014) Application of the radial distribution function for quantitative analysis of neuropil microstructure in stratum radiatum of CA1 region in hippocampus. BioRxiv doi: 10.1101/003863.
8. Mishchenko Y. (2014) Oscillations in rational economies. Plos ONE, 9(2), e87820.
9. Marblestone A., Daugharthy E., Kalhor R., Peikon I., Kebschull J., Shipman S., Mishchenko Y., Lee J. H., Kording K., Boyden E., Zador A., Church G. (2014) Rosetta Brains: A Strategy for Molecularly-Annotated Connectomics. arXiv:1404.5103.
10. Marblestone A., Daugharthy E., Kalhor R., Peikon I., Kebschull J., Shipman S., Mishchenko Y., Dalrymple D., Zamft B., Kording K., Boyden E., Zador A., Church G. (2013) Conneconomics: The Economics of Large-Scale Neural Connectomics. BioRxiv doi: 10.1101/001214.
11. Rah J.-C., Bas E., Colonell J., Mishchenko Y., Karsh B., Fetter R., Myers E., Chklovskii D., Svoboda K., Harris T., Isaac J. (2013) Thalamocortical input onto layer 5 pyramidal neurons measured using quantitative large-scale array tomography. Frontiers in Neural Circuits, 7, 177.
12. Mishchenko Y., Paninski L. (2012) A Bayesian compressed-sensing approach for reconstructing neural connectivity from subsampled anatomical data. Journal of Computational Neuroscience, 33(2), 371.

13. Rivera-Alba M., Vitaladevuni S., Mishchenko Y., Lu Z., Takemura S., Scheffer L., Meinertzhagen I., Chklovskii D., de Polavieja G. (2011) Wiring economy and volume exclusion determine neuronal placement in the Drosophila brain. Current Biology, 21, 2000.
14. Mishchenko Y. and Paninski L. (2011) Efficient methods for sampling spike trains in networks of coupled neurons. Annals of Applied Statistics, 5, 1893.
15. Mishchenko Y., Vogelstein J., Paninski L. (2011) A Bayesian approach for inferring neuronal connectivity from calcium fluorescent imaging data. Annals of Applied Statistics, 5, 1229.
16. Mishchenko Y. (2011) Reconstruction of complete connectivity matrix for connectomics by sampling neural connectivity with fluorescent synaptic markers. Journal of Neuroscience Methods, 196, 289.
17. Mishchenko Y. (2010) On optical detection of densely labeled synapses in neuropil and mapping connectivity with combinatorially multiplexed fluorescent synaptic markers. PLoS ONE 5(1): e8853.
18. Mishchenko Y., Hu T., Spacek J., Mendenhall J., Harris K., Chklovskii D. (2010) Ultrastructural analysis of hippocampal neuropil from the connectomics perspective. Neuron, 67, 1009.
19. Mishchenko Y. (2009) Automation of 3D reconstruction of neural tissue from large volume of conventional serial section transmission electron micrographs. Journal of Neuroscience Methods, 176, 276.
20. Mishchenko Y. (2008) Strategies for identifying exact structure of neural circuits with broad light microscopy connectivity probes. Nature Precedings; retrieved http://hdl.handle.net/10101/npre.2009.2669.2.
21. Ji C.-R., Mishchenko Y., Radyushkin A. (2006) Higher Fock state contributions to the generalized parton distribution of pion. Physical Review D, 73, 114013.
22. Mishchenko Y. (2006) Remedy for the fermion sign problem in the diffusion Monte Carlo method for few fermions with antisymmetric diffusion process. Physical Review E, 73, 026706.
23. Bakker B., DeWitt M., Ji C.-R., Mishchenko Y. (2005) Restoring the equivalence between the light-front and manifestly covariant formalisms. Physical Review D, 72, 076005.
24. Mishchenko Y., Ji C.-R. (2005) A novel variational approach for quantum field theory: example of study of the ground state and phase transition in nonlinear sigma model. International Journal of Modern Physics A, 20, 3488.
25. Mishchenko Y., Ji C.-R. (2005) Exploring properties of dark and visible mass distribution on different scales in the Universe. International Journal of Modern Physics A, 20, 3124.
26. Ji C.-R., Mishchenko Y. (2005) Time to space conversion in quantum field theory of flavor mixing. Annals of Physics, 315, 488.
27. Capolupo A., Ji C.-R., Mishchenko Y., Vitiello C.-R. (2004) Phenomenology of flavor oscillations with nonperturbative effects from quantum field theory. Physics Letters B, 594, 135.
28. Mishchenko Y., Ji C.-R. (2003) Molar mass estimate of dark matter from the dark mass distribution measurements. Physical Review D, 68, 063503.
29. Ji C.-R., Mishchenko Y. (2002) The general theory of quantum field mixing. Physical Review D, 65, 096015.
30. Ji C.-R., Mishchenko Y. (2001) Nonperturbative vacuum effect in the quantum field theory of meson mixing. Physical Review D, 64, 076004.

Book Chapters

31. Mishchenko Y., Ji C.-R. (2005) General formulation of flavor mixing in Quantum Field Theory, in O. Kovras (ed.): Focus on Quantum Field Theory, Nova Science Publisher, pp115-149.

32. Mishchenko Y., Ji C.-R. (2004) Distribution of mass in galaxy cluster CL0024 and the particle mass of dark matter, in J. Val Blain (ed.): Progress in Dark Matter Research, Nova Science Publisher, pp217-239; astro-ph/0406563.
33. Ji C.-R., Mishchenko Y., Shalaby A. (2004) Duality and canonical transformations in the scalar field theory, in S. G. Pandalai: Recent Developments in Physics, vol. 5, Transworld Research Network, pp1487-1510.

Books and Theses

34. Mishchenko Y. (2009) Nontrivial vacuum solutions in flavor mixing and critical phenomena. VDM Verlag: Saarbrucken, 228p.
35. Mishchenko Y. (2004) Applications of Canonical Transformations and Nontrivial Vacuum Solutions to Flavor Mixing and Critical Phenomena in Quantum Field Theory, Ph.D. Dissertation (Supervisor: C.-R. Ji), UMI-31-54334, 226pp.
36. Mishchenko Y. (2000) Nonperturbative Mass Renormalization in 2+1 Scalar Yukawa Model, M.Sc. Thesis (Supervisor: I. Simenog), *unpublished master thesis.*
37. Mishchenko Y. (1999) Precision Quantum Mechanical Variational Calculations of Three-Body Coulomb System ($dt\mu$), B.Sc. thesis (Supervisor: I. Simenog), *unpublished bachelor thesis.*

Conference Presentations

Talks and Presentations at National and International Meetings

1. H. Yanar, Y. Mishchenko "A hidden Markov Model of electroencephalographic brain activity for advanced EEG-based brain computer interfaces", 24th IEEE SIU2016 Signal Processing and Communications Applications Conference, Zonguldak, Turkey, May 16-19 2016.
2. M. Kaya, H. Yanar, Y. Mishchenko "Developing computational infrastructure for an EEG-based brain computer interface", 24th IEEE SIU2016 Signal Processing and Communications Applications Conference, Zonguldak, Turkey, May 16-19 2016.
3. Y. Mishchenko, M. Kaya "Detecting the attention state of an operator in continuous attention task using EEG-based Brain-Computer Interface", 23rd IEEE Signal Processing and Communications Applications Congress SIU2015, Malatya, Turkey, May 16-19 2015.
4. M. Kaya, Y. Mishchenko "The system for estimating operator's attention state", R&D Project Fair 2015 of Mersin Technology Transfer Office, Mersin, Turkey, May 7-8 2015.
5. E. Onel, Y. Mishchenko, M. Miman "The relationships between use features of Information Management Systems", Congress on Information Management Systems YBS2014, Istanbul, Turkey, October 16-17 2014.
6. M. Kaya, Y. Mishchenko, H. Seckin "Methods for direct brain-computer communications using a Brain-Computer Interface", 4th Regional Project Fair of East Mediterranean Universities, Iskenderum, Turkey, April 30 2014.
7. O. O. Akirmak, M. Miman, Y. Mishchenko "A system for lane-tracking suitable for day and night conditions", 4th Regional Project Fair of East Mediterranean Universities, Iskenderum, Turkey, April 30 2014.
8. Y. Mishchenko "Reconstructing functional connectivity in complete neural populations by randomized sparse sampling", COSYNE 2014 Conference, Salt Lake City, UT, USA, February 27 - March 2 2014.
9. Y. Mishchenko "Fluorescent co-localization synaptic markers for connectome reconstructions", 8th FENS Forum of Neuroscience, Barcelona, Spain, June 14-18 2012.
10. Y. Mishchenko and L. Paninski "Efficient methods for sampling spike trains in networks of coupled neurons", COSYNE 2011 Conference, Salt Lake City, UT, USA, February 28 - March 1 2011.

11. J. Vogelstein, T. Machado, Y. Mishchenko, A. Packer, R. Yuste and L. Paninski "Methods for in vitro neural circuit inference from population calcium imaging data", COSYNE 2010 Conference, Salt Lake City, UT, USA, February 28 - March 1 2010.
12. J. Vogelstein, Y. Mishchenko, A. Packer, T. Machado, R. Yuste, L. Paninski "Towards confirming neural circuit inference from population calcium imaging", NIPS 2009 Workshop on Connectivity Inference in Neuroimaging, Whistler, Canada, December 12 2009.
13. Y. Mishchenko, J. Vogelstein, L. Paninski "Statistical reconstruction of neural connectivity from the data produced using stochastically Cre/Lox guided fluorescent synaptic marker GRASP", SfN Meeting 2009, Chicago, USA, September 17-21 2009.
14. J. Vogelstein, Y. Mishchenko, A. Packer, T. Machado, R. Yuste, L. Paniski, "Towards confirming neural circuit inference from population calcium imaging", SfN Meeting 2009, Chicago, USA, September 17-21 2009.
15. Y. Mishchenko, "Using Brainbow and GRASP for detailed reconstruction of complete circuits with light microscopy", COSYNE 2009 Conference, Salt Lake City, UT, USA, February 26 - March 03 2009.
16. S. Vitaladevuni, Y. Mishchenko, A. Genkin, D. Chklovskii, K. Harris, "Mitochondria detection in electron microscopy images", MIAAB 2008 Workshop, New York, NY, USA, September 06 2008.
17. Y. Mishchenko, J. Spacek, J. Mendenhall, K. Harris and D. Chklovskii, "Full electron microscopy reconstructions reveal organization of hippocampus neuropil at nanometer resolution", SfN Meeting 2008, Washington, DC, USA, November 15-19 2008.
18. S. Vitaladevuni, Y. Mishchenko, A. Genkin and D. Chklovskii, "Brain circuit reconstruction from electron micrographs", JFRC HHMI Meeting on "What can computer vision do for neuroscience and vice versa?", JFRC HHMI, Ashburn, VA, USA, September 14-17 2008.
19. M. Rivera-Alba, Y. Mishchenko, S. Vitaladevuni, R. Fetter, Z. Lu, G. de Polavieja, I. Meinertzhagen, D. Chklovskii, "Reconstructing the first stage of visual processing", JFRC HHMI Meeting on "What can computer vision do for neuroscience and vice versa?", JFRC HHMI, Ashburn, VA, USA, September 14-17 2008.
20. Y. Mishchenko, A. Genkin, D. Chklovskii, "Automation of reconstruction of neuropil from serial electron micrographs: current results and future prospects", JFRC HHMI Meeting on "Neural Circuit Reconstruction", JFRC HHMI, Ashburn, VA, USA, September 23-26 2007.
21. D. Chklovskii, Y. Mishchenko, J. Spacek, K. Harris, "Analysis of the neuropil micro-architecture using semi-automated 3D reconstructions from electron microscope", JFRC HHMI Meeting on "Neural Circuit Reconstruction", JFRC HHMI, Ashburn, VA, USA, September 23-26 2007.
22. K. Harris, J. Spacek, Y. Mishchenko, D. Chklovskii, "What we can learn about circuitry from high resolution, full volume reconstruction of brain neuropil", JFRC HHMI Meeting on "Neural Circuit Reconstruction", JFRC HHMI, Ashburn, VA, USA, September 23-26 2007.
23. Y. Mishchenko, D. Chklovskii, "Large scale electron microscope reconstructions of brain structure", UKC 2007 Meeting, Washington, DC, USA, August 9-12 2007.
24. C.-R. Ji, Y. Mishchenko, "Application of particle physics to Cosmology: correlation of the mass scale between dark matter and Quantum Chromodynamics", UKC 2007 Meeting, Washington, DC, USA, August 9-12 2007.
25. Y. Mishchenko, D. Chklovskii, "Automated large scale reconstruction of neural circuits using electron microscopy", Annual Meeting of the Sloan-Swartz Center for Theoretical Neurobiology, Sand Diego, CA, USA, July 28-31 2007.
26. Y. Mishchenko, A. Koulakov, D. Chklovskii, "Neuronal circuits reconstruction with full 3D segmentation of serial thin section electron micrographs", CSHL Meeting on "Neuronal Circuits: From Structure To Function", Cold Spring Harbor, NY, USA, March 9-12 2006.

27. Y. Mishchenko, A. Koulakov, D. Chklovskii, "Automated 3D reconstruction of neuronal circuitry from serial electron micrographs", SfN Meeting 2005, Washington, DC, USA, November 12-16 2005.
28. C.-R. Ji, Y. Mishchenko, "Correlations of Mass Distributions between Dark Matter and Visible Matter", KIAS-APCTP-DMRC Workshop "The Dark Side of the Universe", Seoul, Korea, May 24-26 2005.
29. Y. Mishchenko, C.-R. Ji, "Exploring the properties of dark and visible mass distributions on different scales in the universe", DPF Meeting 2004, Riverside, CA, USA, August 26-31 2004.
30. Y. Mishchenko, C.-R. Ji, "New approach to variational method for the quantum field theory: example of critical phenomena in 2+1 dimensional nonlinear sigma model", DPF Meeting 2004, Riverside, CA, USA, August 26-31 2004.
31. Y. Mishchenko, C.-R. Ji, "Phase structure of ϕ^4_{1+1} scalar theory with non-zero magnetic field", DPF meeting 2002, Williamsburg, VA, USA, May 24-28 2002.
32. Y. Mishchenko, C.-R. Ji, "The general quantum field theory of flavor mixing", SESAPS Meeting 2002, Auburn, AL, USA, October 31 - November 2 2002.
33. Y. Mishchenko, C.-R. Ji, "Nonperturbative vacuum effect in meson mixing", SESAPS Meeting 2001, Charlottesville, VA, USA, November 4-6 2001.
34. Y. Mishchenko, I. Simenog, "Nonperturbative mass renormalization in 2+1 scalar Yukawa model", talk, Annual Student Conference at National Kiev University of Taras Shevchenko, Kiev, Ukraine, May 2000.
35. Y. Mishchenko, I. Simenog, "Variational high-precision calculations of the meso-molecules ground states", talk, Annual Student Conference at National Kiev University of Taras Shevchenko, Kiev, Ukraine, May 1999.

Invited Speeches and Presentations

36. Y. Mishchenko "Reconstructing functional neural circuits with single cell resolution: Statistical methods for inferring neural network topology from large scale neural activity imaging data", Janelia Research Campus of Howard Hughes Medical Institute, Ashburn, VA, USA, November 19 2016.
37. Y. Mishchenko "Bayesian inference of neural connectivity from calcium imaging data in the presence of hidden inputs", Center for Theoretical Neuroscience Seminar, Columbia University, New York, NY, USA, December 3 2010.
38. Y. Mishchenko "Strategies for recovering exact structure of neural circuits with broadly targeted fluorescent connectivity probes", Princeton Theoretical Group Colloquium, Princeton University, Princeton, NJ, USA, April 23 2009.