

## CURRICULUM VITAE

Vassiliy, Ph.D.

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The Uniformed Services University of the Health Sciences,  
Department of Pharmacology and Molecular Therapeutics  
University of Maryland – College Park, Department of Bioengineering  
University of Maryland – School of Medicine, Department of Anatomy and Neurobiology  
Johns Hopkins University – Applied Physics Laboratory and Applied Bioengineering Program

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**Citizenship:** USA

### PROFESSIONAL GOALS

I am looking for a position (faculty or other appropriate level) in neuroscience. I am interested in the development and plasticity of the cerebral cortex and somatosensory system using rodent models. Although I am especially interested in animal models of neurological disorders, I am open to any relevant opportunity with the goal of serving the interests and needs of the team.

### EDUCATION

**1989 – 1993** Bachelor / Master Science, Biology, Saint Petersburg State University, Russia

**1998:** Ph.D. in Neuroscience, Saint Petersburg State University, Russia

**1998 – 2003** Postdoctoral Training: Brain Science Institute of RIKEN, Japan

**2003 – 2005** Research Fellow, Kyoto University, Human Brain Research Center, Japan

### CURRENT POSITION

**01.10. 2019** Uniformed Services University of the Health Sciences Researcher at the Henry M. Jackson Foundation for the Advancement of Military Medicine

**01.10. 2018** Visiting Research Assistant Professor, University of Maryland, Department of Bioengineering

**03.01.2017** Adjunct Faculty Member at Johns Hopkins University, Applied Physics Laboratory

### RESEARCH INTERESTS

brain imaging technologies; brain plasticity and development; decision-making; epileptic seizures; neuronal circuits; neuronal correlates of behavior; neural regulation of gene expression; neuronal-microglial interactions in the physiology and pathology of the central nervous system; sensory coding and synaptic plasticity; traumatic brain injury, models and regenerations

### TEACHING, TRAINING AND MENTORING

- **2017 – current**, Johns Hopkins University:
- One-on-one training of students and postdocs in rodent surgery, various imaging techniques and imaging data analysis
- One-on-one training of students and postdocs in various electrophysiology techniques, and EEG data analysis (LabChart, NeuroScore (Data Science), Ponemah)
- One-on-one training of students and postdocs in 2-photon *in vivo* imaging techniques and various optogenetic techniques

### HONORS AND AWARDS

- **Award of 2017 Annual Research Publication Award Dinner (APRAD) - Naval Research Laboratory**, Department of Navy
- Society for Brain Mapping and Therapeutics – **Board of Directors**, 2016
- Elected Member **Alumni Association Special Committee** of Japanese Society for Promotion of Science, elected on March, 2015
- **Honorary Professor**, European Society for Advance of the Neuroscience, November 11, 2013
- Journal of Neuroscience and Neuroengineering **Best Paper in 2012 Award**, March, 2013
- The manuscript “Photoacoustic microscopy of microvascular responses to cortical electrical stimulation”, by Tsytsarev V et al, J Biomed Opt. 2011 J16(7):076002 has been selected for inclusion in **Faculty of 1000**

## PROFESSIONAL SOCIETY MEMBERSHIPS

**2013** – Society for Brain Mapping and Therapeutics, Member of Directorial Board

**2012** - Japanese Society for Promotion of Science (JSPS) Alumni Association

**2009** - *Sigma Xi*

**2000** - Society for Neuroscience (SFN)

**1999** - International Brain Research Organization (IBRO)

## EDITORIAL AND PEER REVIEW SERVICES

2021: Editorial Board Member of **The Journal of Neuroscience Methods**, Elsevier

2012: Senior Editor, **Journal of Neuroscience and Neuroengineering** (American Scientific Publishers)

2016: Guest Editor of the Special Issue, **Neurophotonics (SPIE)**

2011: Editorial Board Member of **World Journal of Neurology**

2009: Review Editor of “**Frontiers in Neuroengineering**”

2016, Official editorial board member of World Journal of Clinical Cases.

Since 2013, Reviewer for International Journal of Nanomedicine

Since 2013, Reviewer for Nature Neuroscience

Since 2011, Reviewer for BMC Neuroscience

Since 2011, Reviewer for Journal of NeuroEngineering

Since 2009, Reviewer for Optics Express

Since 2009, Reviewer for Applied Optics

Since 2008, Reviewer for Sensors

Since 2008, Reviewer for BioTechniques

Since 2007, Reviewer for NeuroImage

## PATENTS

- **2020 – 2021** (Noninvasive deep brain stimulation (DBS) using X-ray-excited optical luminescence (XEOL) nanomaterials (NANO SCINTILLATORS), Elena A. Rozhkova; Zhaowei Chen; **Vassiliy Tsytsarev**, US Patent: 20210060164: <https://www.freepatentsonline.com/y2021/0060164.html>
- **2016** Chen Y, Tang Q, **Tsytsarev V**, Erzurumlu S. Oblique Time-Resolved Angled Parallel Scanning Laminar Optical Tomography; Invention, submitted via the University of Maryland Patent System
- **2011 Tsytsarev V**, Maslov K, Demchenko AV. In vivo imaging of epileptic activity using a fluorescent deoxyglucose analog (2-NBDG); Invention submitted by University of Missouri, St. Louis
- **2010 Tsytsarev V**, Garver W. “Multidirectional Whiskers Magnetic Stimulator”, Invention Disclosure Form # **um16c\_08UMS009**, 2008 – 2010

## FELLOWSHIPS AND GRANTS

- 2015** – Visiting scientist at Muenchen Technical University, Germany  
**2003 – 2005**: Japanese Society Promotion of Science (JSPS) Special Research Grant  
**1998** – Fellowship of the Center of International Mobility Organization, Finland  
**1995** – Fellowship of the Center of Galician Studies (Spain)  
**1995 – 1997** – Post-Graduate Support Program of the George Soros Foundation  
**1995** – Elba International Neuroscience Program, Summer School Italy  
**1994** – Research Grant of the St. Petersburg-Finland Joint Research Foundation.  
**1994** – Research Grant - Biological Program, St. Petersburg State University  
**1991** – Elba International Neuroscience Program, Summer School, Italy

## TEACHING EXPERIENCE

**2021 – Currently**: EN.525.603.81.FA21 Advanced Topics in Optical Medical Imaging, **Johns Hopkins University**, Program of Biomedical Engineering

**2017 - Currently**: Lecturer at **Applied Physics Laboratory, Johns Hopkins University**, Brain Optical Imaging, course for graduate students

**2015** - Molecular and Behavioral Neuroscience; course of lecture at Morgan State University

**2014** - Visualization of the Brain Activity: Optical Methods in Clinic and Experiments; Short course of lectures, Russian Academy of Science (Personal Grant of the “Dynasty Foundation”), St. Petersburg, Russia

**2014** – Visiting Assistant Professor, Department of Bioengineering, University of Maryland in College Park (one lecture per semester for undergraduate students)

**2012** - In Vivo Optical Imaging of the Brain Activity. Short course, St. Petersburg State University, St. Petersburg, Russia

**2006 - 2007**: Biophysics of Imaging (PHYS 5400), Developed Course for Undergraduate and Graduate Students including labs and seminar, 4 credit hours; Research Assistant Professor, University of Missouri at Saint Louis

**2003 – 2004**: Occasional lectures and mentoring: In Vivo Optical Imaging (*Ad hoc* Instructor), Kyoto University School of Medicine, Kyoto, Japan

## PUBLICATIONS

### Books

**Tsytsarev V**, Yamamoto V, Zhong N; Functional Brain Mapping: Methods and Aims ISBN 978-981-15-6882-4, DOI:10.1007/978-981-15-6883-1, *Springer Nature, 2020*

### **Book Chapters**

**Tsytsarev V**. Optical imaging of epileptic seizures; In: Springer Handbook of Neuroengineering (Springer, Cham Ed: Nitish V. Thakor) In Press; planned publication: Spring 2022

Kalchenko V, Harmelin A, Israeli D, Kateb B, Meglinski I, Tang Q, Thakor NV, Ignashchenkova A, Volnova A, and **Vassiliy Tsytsarev**; Transcranial Dynamic Fluorescence Imaging for the Study of the Epileptic Seizures; 10.1007/978-981-15-6883-1\_3 Springer Nature, 2020

**Tsytsarev V**, Papkovsky D. Chapter 16: In vivo Brain Functional Imaging Using Oxygenation-related Optical Signal. In: Quenched-phosphorescence Detection of Molecular Oxygen; Royal

Society of Chemistry, 2018, ISBN: 978-1-78801-175-4, UK

**Tsytsarev V** and Erzurumlu R. Voltage-Sensitive Dye and Intrinsic Signal Optical imaging: Advantages and Disadvantages for Functional Brain Mapping. In: Brain Mapping and Therapeutics, 2017 by CRC ISBN 9781482236859

Kateb B, Boehm F, Jalali B, **Tsytsarev V**, Yamamoto V, Jalali B, Backer D, Pikul B, Yashar P, and Chen Y. History of Brain Mapping and Neurophotonics: from Technological Discoveries to Brain Initiative. In: Brain Mapping and Therapeutics, 2017 by CRC ISBN 9781482236859

Ascoli G, Berzhanskaya J, **Tsytsarev V**. Microscopy; Elsevier Inc, Encyclopedia of Neurological Sciences, 2nd ed. (M. Aminoff & R. Daroff, Eds.) 2014

### **Peer-Reviewed Articles**

1. **Tsytsarev V**. Methodological aspects of studying the mechanisms of consciousness Behavioural Brain Research. Behav Brain Res. 2021 Nov 24;113684
2. Chen Z, **Tsytsarev V (Co-First author)**, Finfrock Y, Antipova O, Cai Z, Arakawa H, Lischka F, Hooks B, Wilton R, Wang D, Liu Y, Gaitan B, Tao Y, Chen Y, Erzurumlu R, Yang H, Rozhkova E. Wireless Optogenetic Modulation of Cortical Neurons Enabled by Radioluminescent Nanoparticles; **ACS Nano**; Mar 23;15(3):5201-5208, 2021
3. Volnova A, **Tsytsarev V**, Ptukha M, Inyushin M; In Vitro and In Vivo Study of the Short-Term Vasomotor Response during Epileptic Seizures; Brain Sci. 2020, 10(12), 942
4. Tang Q, **Tsytsarev V (Co-First author)**, Yan F, Wang C, Erzurumlu R, Chen Y; In Vivo Voltage-Sensitive Dye Imaging of Mouse Cortical Activity with Mesoscopic Optical Tomography; Neurophotonics; 2020;7(4):041402
5. Muller BJ, Zhdanov AV, Borisov SM, Foley T, Okkelman IA, **Tsytsarev V**, Tang Q, Erzurumlu RS, Chen Y, Zhang H, Toncelli C, Klimant I, Papkovsky DB, Dmitriev RI; Nanoparticle-Based Fluoroionophore for Analysis of Potassium Ion Dynamics in 3D Tissue Models and In Vivo; Adv. Funct. Mater. 2018, 1704598
6. **Tsytsarev V**, Arakawa H, Zhao S, Chedotal A, Erzurumlu RS. Behavioral consequences of a bifacial map in the mouse somatosensory cortex, J Neurosci. 2017, 37(30):7209-7218
7. Lee LJ, **Tsytsarev V**, Erzurumlu RS Structural and functional differences in the barrel cortex of Mecp2 null mice. J Comp Neurol. 2017; 15;525(18):3951-3961
8. Kwon SE, **Tsytsarev V**, Erzurumlu RS, O'Connor DH. Organization of orientation- specific whisker deflection responses in layer 2/3 of mouse somatosensory cortex. Neuroscience. 2017; 4. pii: S0306-4522(17)30553-5
9. Tang Q, Liu Y, **Tsytsarev V**, Lin J, Wang B, Kanniyappan U, Li Z, Chen Y. High- dynamic-range fluorescence laminar optical tomography (HDR-FLOT). Biomed Opt Express. 2017; 8(4):2124-2137
10. Nag OK, Stewart MH, Deschamps JR, Susumu K, Oh E, **Tsytsarev V**, Tang Q, L Efron A, Vaxenburg R, Black BJ, Chen Y, O'Shaughnessy TJ, North SH, Field LD, Dawson PE, Pancrazio JJ, Medintz IL, Chen Y, Erzurumlu RS, Huston AL, Delehanty JB. Quantum Dot-Peptide-Fullerene Bioconjugates for Visualization of In Vitro and In Vivo Cellular Membrane Potential. ACS Nano. 2017 ; 27;11(6):5598-5613
11. **Tsytsarev V**, Akkenti F, Pumbo E, Tang Q, Chen Y, Erzurumlu RS, Papkovsky DB. Planar Implantable Sensor for In Vivo Measurement of Cellular Oxygen Metabolism in Brain Tissue. J Neurosci Methods. 2017; 20; 281:1-6
12. Nikzad S, Chen Y, **Tsytsarev V**, Kateb B, Grundfest W. Special Section Guest Editorial: Brain Mapping and Therapeutics. Neurophotonics. 2017;4(1):011001

13. Tang Q, Lin J, **Tsytsarev V**, Erzurumlu RS, Liu Y, Chena Y. Review of mesoscopic optical tomography for depth-resolved imaging of hemodynamic changes and neural activities, *Neurophotonics* 2017 4(1):011009
14. Gottschalk S, Fehm TF, Dean-Ben XL, **Tsytsarev V**, and Razansky D. Correlation between Volumetric Oxygenation Responses and Electrophysiology Identifies Deep Thalamo-Cortical Activity During Epileptic Seizures; *Neurophotonics*, *Neurophotonics*. 2017; 4(1):011007
15. Tang Q, **Tsytsarev V (Co-First author)**, Frank A, Wu Y, Chen CW, Erzurumlu RS, Chen Y. (2016) In Vivo Mesoscopic Voltage-Sensitive Dye Imaging of Brain Activation. *Sci Rep. Nature Publishing Group*, 29;6:25269
16. **Tsytsarev V**, Pumbo E, Tang Q, Chen C-W, Kalchenko V, Chen Y. (2016) Study of the cortical representation of whisker frequency selectivity using voltage-sensitive dye optical imaging. *Intravital*, VOL. 5, NO. 1, e1142637
17. Tang Q, **Tsytsarev V (Co-First author)**, Liang C-P, Akkentli F, Erzurumlu RS, Chen Y. (2015) In Vivo Voltage-Sensitive Dye Imaging of Subcortical Brain Function, *Sci Rep. Nature Publishing Group* 2015 27;5:17325.
18. Arakawa H, Suzuki A, Zhao S, **Tsytsarev S**, Lo F-S, Hayashi Y, Itohara S, Iwasato T, Erzurumlu RS. (2014) Thalamic NMDA receptor function is necessary for patterning of the thalamocortical somatosensory map and for sensorimotor behaviors. *J Neurosci*. 3;34(36):12001-14
19. **Tsytsarev V**, Liao L-D, Kong KV, Liu YH, Erzurumlu RS, Olivo M and Thakor NV. (2014) Recent Progress in Voltage-Sensitive Dye Imaging for Neuroscience *J. Nanosci. Nanotechnol.* 14, 4733-4744
20. Lo FS, Akkentli F, **Tsytsarev V**, Erzurumlu RS. (2013) Functional significance of cortical NMDA receptors in somatosensory information processing. *J Neurophysiol.* 110(11):2627-36
21. **Tsytsarev V**, Rao B, Maslov KI, Li L, Wang LV. (2013) Photoacoustic and optical coherence tomography of epilepsy with high temporal and spatial resolution and dual optical contrasts. *J Neurosci Methods*. *J Neurosci Methods*. 15;216(2):142-5
22. **Tsytsarev V**, Arakawa H, Borisov S, Pumbo E, Erzurumlu RS, Papkovsky DB. (2013) In vivo imaging of brain metabolism activity using a phosphorescent oxygen-sensitive probe. *J Neurosci Methods*. *J Neurosci Methods*. 15;216(2):146-51
23. Liao LD, **Tsytsarev V**, Delgado-Martínez I, Li ML, Erzurumlu R, Vipin A, Orellana J, Lin YR, Lai HY, Chen YY, Thakor NV. (2013) Neurovascular coupling: in vivo optical techniques for functional brain imaging. *Biomed Eng Online*. 30;12(1):38
24. **Tsytsarev V**, Bernardelli C, Maslov KI. (2012) Living Brain Optical Imaging: Technology, Methods and Applications. *J of Neuroscience and Neuroengineering*; 1: 180-192
25. Lenkov DN, Volnova AB, Pope ARD, **Tsytsarev V**. (2012) Advantages and limitations of brain imaging methods in the research of absence epilepsy in humans and animal models. *J Neurosci Methods*. S0165-0270(12)00443-8
26. Yao J, Xia J, Maslov K, Nasiriavanaki M, **Tsytsarev V**, Demchenko AV, Wang LV; (2012) Noninvasive photoacoustic computed tomography of mouse brain metabolism in vivo; *Neuroimage*; 64C:257-266
27. **Tsytsarev V**, Maslov K, Yao J, Parameswar AR, Demchenko AV, Wang LV. (2012) In vivo imaging of epileptic neuronal activity using a fluorescent deoxyglucose analog (2-NBDG); *J Neurosci Methods*. 203(1):136-40

28. **Tsytsarev V**, Hu S, Yao J, Maslov K, Barbour DL, Wang LV (2011) Cortical Microvascular Responses to Direct Electrical Stimulation: an Optical-Resolution Photoacoustic Microscopy Study. *J Biomedical Optics* 16(7), 076002-6
29. **Tsytsarev V**, Pope D, Pumbo E, Yablonskii A, Hofmann M. (2010) Study of the cortical representation of whisker directional deflection using voltage-sensitive dye optical imaging. *Neuroimage*. Oct 15;53(1):233-8
30. **Tsytsarev V**, Pope D, Pumbo E, Garver W. (2010) Intrinsic Optical Imaging of Directional Selectivity in Rat Barrel Cortex: Application of the Multidirectional Magnetic Whiskers Stimulator; *J Neurosci Methods* 30;189 (1):80-3
31. **Tsytsarev V**, Yao J, Hu S, Li L, Favazza CP, Maslov KI, Wang LV (2010). Invasive and Transcranial Photoacoustic Imaging of the Vascular Response to Brain Electrical Stimulation. *Proc. SPIE*, Vol. 7564, 756407
32. Li L, Rao B, **Tsytsarev V**, Wang LV. (2010) Integrated photoacoustic and optical coherence microscopy and its biomedical applications. in *Biomedical Optics*, OSA Technical Digest, Optical Society of America, BWE3
33. Hu S, Maslov K, **Tsytsarev V**, Wang LV, (2009) Functional transcranial brain imaging by optical-resolution photoacoustic microscopy *J. Biomed. Opt.* 14 (4), 501-4
34. **Tsytsarev V**, Fukuyama H, Pope D, Pumbo E, Kimura M. (2009) Optical imaging of interaural time difference representation in rat auditory cortex; *Frontiers in Neuroengineering*; 2, 1-7
35. **Tsytsarev V**, Premachandra K, Takeshita D, Bahar S. (2008) Imaging cortical electrical stimulation in vivo: fast intrinsic optical signal versus voltage-sensitive dyes; *Optics Letters*, 33; 9, 1032-1034
36. **Tsytsarev V**, Taketani M, Schottler F, Tanaka S, Hara M. (2006) New planar multielectrode array: recording from a rat auditory cortex. *J. Neural. Eng.* 3, 293–298
37. Callan D, **Tsytsarev V**, Hanakawa T, Callan A, Katsuhara M, Fukuyama H, Turner R. (2006) *NeuroImage*. Song and Speech: Brain Regions Involved with Perception and Covert Production. 31, 1327-42
38. **Tsytsarev V**, Kirilkin I, Khiroug L. Transcranial in vivo optical imaging using confocal microscopy (2005). *J Cogn Neurosci Suppl*, 31-32
39. **Tsytsarev V**, Yamazaki T, Ribot, J, and Tanaka S. (2004). Sound frequency representation in cat auditory cortex. *NeuroImage* 23, 1246–1255
40. **Tsytsarev V**, Tanaka S. (2003). Functional Mapping: Mapping Intrinsic Signals of the Auditory Cortex. *The Journal of the Brain Science Institute of RIKEN*, 10; 5
41. **Tsytsarev V**, Tanaka S. (2002). Intrinsic optical signals from rat primary auditory cortex in response to sound stimuli presented to contralateral, ipsilateral and bilateral ears. *Neuroreport* 13, 1661–1665
42. **Tsytsarev V**, Lenkov D, Volnova A. (1999) Effect of tetanization of the motor cortex on neuronal responses in the albino rat mesial cortex *Fiziol Zh Im I M Sechenova* 85(8) 1116-8
43. Ignashchenkova A, **Tsytsarev V**, Lenkov D. (1998) Study of peripheral and central inputs into the mesial cortex in adult and developing rats. *Eur J Neurosci Suppl* 10 : 3132
44. Inyushin M, **Tsytsarev V**, Ignashchenkova A, Lenkov D. (1997) Use of artificial ion channels

for quasi-intracellular recording of cerebral cortex neuron activity. *Neurosci Behav Physiol* 27:6 702-7

45. **Tsytsarev V**, Ignashchenkova A. (1996). Effect of stimulation of the peripheral pathways and somatosensory cortex on the neuronal activity of the medial wall of the prefrontal cortex in the white rat. *Fiziol Zh Im I M Sechenova*. 82:1, 45-51
46. **Tsytsarev V**, Golikova T. (1994) The influence of cingulate cortex stimulation on the activity of neurons of the motor cortex in the white rat. *Neurosci Behav Physiol*.24:5 438-9
47. **Tsytsarev V**, Golikova T. (1993) The effect of stimulation of the cingulate cortex on the neuronal activity of the motor cortex in the white rat. *Fiziol Zh Im I M Sechenova*. 79:9, 106-8

### **INVITED TALKS (selected only)**

**22. 04. 2020. Invited speaker:** *Optogenetics+ 2020*, Saint Petersburg, Russia

**06 .03. 2018 Invited faculty:** International Summer School in Modern Optics and Biophotonics, Mexico, INAOE, Puebla

**11. 17. 2017. Session Chair and Invited speaker:** The 2017 International Conference on Brain Informatics (BI 2017); Workshop on Novel Methods of the Brain Imaging in the Clinical and Preclinical Neuroscience

**04. 18. 2017. Session Chair:** 14th Annual World Congress of Society for Brain Mapping and Therapeutics, Los Angeles, CA

**03. 08. 2015. Session Chair:** 13th Annual World Congress of Society for Brain Mapping and Therapeutics, Miami, FL

**11.13.2015 Session Chair and Invited speaker:** 2nd Annual G20 World Brain Mapping & Therapeutic Scientific Summit 13 November, Istanbul - 15 November, Antalya, Turkey

### **REFERENCES**

Dr. Reha S. Erzurumlu  
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