

**Kiryl D. Piatkevich, PhD**  
**Molecular Bioengineering Group Leader**

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**Summary:**

Development of novel methods of neural interfacing using synthetic biology; development of scalable and multiplexed nanoscale imaging of large biological samples (expansion microscopy); synthetic biology, neuroimaging, and neuroengineering, high-throughput robotic cell screening systems; molecular and cellular determinants of Alzheimer's disease phenotypes.

**EDUCATION:**

**Albert Einstein College of Medicine** Bronx, New York  
**Lomonosov Moscow State University** Moscow, Russia  
*Ph.D. in Biotechnology and Biochemistry* October, 2007 – February, 2011

**Lomonosov Moscow State University** Moscow, Russia  
*M.S. in Chemistry (summa cum laude)* August, 2002 - June, 2007

**Belarusian State University** Minsk, Belarus  
*Certificate of the Lyceum in Chemistry* August, 2000 - June, 2002

**WORK EXPERIENCE:**

**Westlake University** Hangzhou, China  
*Assistant Professor* October 2019 - *present*  
*Principal Investigator, Molecular BioEngineering group, School of Life Sciences*

**Massachusetts Institute of Technology** Cambridge, Massachusetts  
*Research scientist (advisor Prof. Edward S. Boyden)* June 2018 – September 2019  
Project title/responsibilities: conceiving and supervising projects on development of new scalable tools for brain interfacing; development of multiplexed nanoscale imaging of large biological samples (expansion microscopy); cell type specific analysis to understand mechanisms underlying Alzheimer's disease phenotypes.

**Massachusetts Institute of Technology** Cambridge, Massachusetts  
*Postdoctoral associate (advisor Prof. Edward S. Boyden)* July 2013 – May 2018  
Project title: Development of novel methods of neural interfacing using synthetic biology; development of scalable and multiplexed nanoscale imaging of large biological samples (expansion microscopy).

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**Albert Einstein College of Medicine**

*Postdoctoral associate* (advisor Prof. Vladislav V. Verkhusa)

Project title: Development of advanced near-infrared fluorescent proteins for *in vivo* applications.

Bronx, New York

April 2011 – June 2013

**Lomonosov Moscow State University**

**Albert Einstein College of Medicine**

*PhD student* (advisor Prof. Vladislav V. Verkhusa)

Project title: Development of fluorescent proteins for multicolor intravital two-photon imaging.

Moscow, Russia

Bronx, New York

October 2007 – February 2011

**Zhejiang University**

*Visiting Scientist* (advisor Prof. Yin Shen)

Project title: Development of genetically encoded ratiometric chloride/pH sensors with enhanced sensitivity and temporal resolution for neuroimaging.

Hangzhou, China

November 2010 – February 2011

**PUBLICATIONS:**

Scholar Google link: <https://scholar.google.com/citations?user=V3YNjNEAAAAAJ&hl=en>

Semantic Scholar link: <https://www.semanticscholar.org/author/Kiryl-D-Piatkevich/6440263>

*Peer-reviewed research articles:*

- Eom, M., Han, S., Park, P., Kim, G., Cho, E.-S., Sim, J., Lee, K.-H., Kim, S., Tian, H., Böhm, U. L., Lowet, E., Tseng, H., Choi, J., Lucia, S. E., Ryu, S. H., Rózsa, M., Chang, S., Kim, P., Han, X., **Piatkevich, K.D.**, Choi, M., Kim, C.-H., Cohen, A.E., Chang, J.-B., Yoon, Y.-G. Statistically unbiased prediction enables accurate denoising of voltage imaging data. *Nature Methods*. 2023. 20(10), 1581–1592.
- Zhang, H., Papadaki, S., Sun, X., Wang, X., Drobizhev, M., Yao, L., Rehbock, M., Köster, R. W., Wu, L., Namikawa, K., **Piatkevich, K. D.\*** Quantitative assessment of near-infrared fluorescent proteins. *Nature Methods*. 2023. 20(10), 1605–1616.
- Subach, O. M., Vlaskina, A. V., Agapova, Y. K., Nikolaeva, A. Y., Varizhuk, A. M., Podgorny, O. V., **Piatkevich, K. D.**, Patrushev, M. V., Boyko, K. M., Subach, F. V., Shemyakin, M. M., and Ovchinnikov, Y. A. YTnC2, an improved genetically encoded green calcium indicator based on toadfish troponin C. *FEBS Open Bio*. 2023. 13(11), 2047–2060.
- Lowet, E., Sheehan, D. J., Chialva, U., De Oliveira Pena, R., Mount, R. A., Xiao, S., Zhou, S. L., Tseng, H., Gritton, H., Shroff, S., Kondabolu, K., Cheung, C., Wang, Y., **Piatkevich, K. D.**, Boyden, E. S., Mertz, J., Hasselmo, M. E., Rotstein, H. G., and Han, X. Theta and gamma rhythmic coding through two spike output modes in the hippocampus during spatial navigation. *Cell Reports*. 2023. 42, 112906.
- Subach, O. M., Varfolomeeva, L., Vlaskina, A. V., Agapova, Y. K., Nikolaeva, A. Y., **Piatkevich, K. D.**, Patrushev, M. V., Boyko, K. M., and Subach, F. V. FNCaMP, ratiometric green calcium indicator based on mNeonGreen protein. *Biochem. Biophys. Res. Commun.* 2023.

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- Subach, O.M., Vlaskina, A. V, Agapova, Y.K., Nikolaeva, A.Y., Anokhin, K. V, **Piatkevich, K.D.**, Patrushev, M. V, Boyko, K.M., and Subach, F. V Blue-to-Red TagFT, mTagFT, mTsFT, and Green-to-FarRed mNeptusFT2 Proteins, Genetically Encoded True and Tandem Fluorescent Timers *Int. J. Mol. Sci.* 2023 24, 3279.
- Li, L., Sun, C., Sun, Y., Dong, Z., Wu, R., Sun, X., Zhang, H., Jiang, W., Zhou, Y., Cen, X., Cai, S., Xia, H., Zhu, Y., Guo, T.\*, **Piatkevich, K. D.\*** Spatially resolved proteomics via tissue expansion. *Nat. Commun.* 2022 131 13, 1–13.
- Subach, O.M., Vlaskina, A. V., Agapova, Y.K., Korzhenevskiy, D.A., Nikolaeva, A.Y., Varizhuk, A.M., Subach, M.F., Patrushev, M. V., **Piatkevich, K.D.**, Boyko, K.M., et al. cNTnC and fYTnC2, Genetically Encoded Green Calcium Indicators Based on Troponin C from Fast Animals *Int. J. Mol. Sci.* 2022, Vol. 23, Page 14614 2022 23, 14614.
- Liang, G.-T., Lai, C., Yue, Z., Zhang, H., Li, D., Chen, Z., Lu, X., Tao, L., Subach, F. V., Piatkevich, K.D.\* Enhanced small green fluorescent proteins as a multisensing platform for biosensor development *Front. Bioeng. Biotechnol.* 2022, 0, 1942.
- Subach, O.M., Vlaskina, A.V, Agapova, Y.K., **Piatkevich, K.D.**, Patrushev, M.V., Samygina, V.R., Subach, F.V. LSSmScarlet2 and LSSmScarlet3, Chemically Stable Genetically Encoded Red Fluorescent Proteins with a Large Stokes' Shift *Int. J. Mol. Sci.* 2022 23, 11051.
- Papadaki, S., Wang, X., Wang, Y., Zhang, H., Jia, S., Liu, S., Yang, M., Zhang, D., Jia, J.-M., Köster, R. W., Namikawa, K., **Piatkevich, K. D.\*** Dual-Expression System for Blue Fluorescent Protein Optimization. *Sci. Reports* 2022 121 2022, 12 (1), 1–16.
- Cabán, C.C.T., Yang, M., Lai, C., Yang, L., Subach, F. V., Smith, B.O., **Piatkevich, K.D.\***, and Boyden, E.S.\* Tuning the Sensitivity of Genetically Encoded Fluorescent Potassium Indicators through Structure-Guided and Genome Mining Strategies. *ACS Sensors* 2022 7 (5), 1336–1346.
- Zheng, Y., Wang, Y., Zhang, F., Zhang, S., **Piatkevich K.D.**, Zhou, N., Pokorski, J.K. Coagulation Bath-Assisted 3D Printing of PEDOT: PSS with High Resolution and Strong Substrate Adhesion for Bioelectronic Devices. *Advanced Materials Technologies* 2022 2101514.
- Zhang, H., Papadaki, S., Sun, X., Yao, L., Drobizhev, M., Wang, X., Köster, R. W., Wu, L., Namikawa, K., **Piatkevich, K. D.\*** Quantitative assessment of near-infrared fluorescent proteins. *Nature Methods* 2021 (*accepted in principle*) (\*corresponding).
- Babakhanova, S., Jung, E. E., Namikawa, K., Zhang, H., Wang, Y., Subach, O. M., Korzhenevskiy, D. A., Rakitina, T. V., Xiao, X., Wang, W., Shi, J., Drobizhev, M., Park, D., Eisenhard, L., Tang, H., Köster, R. W., Subach, F. V., Boyden, E. S.\* , **Piatkevich, K. D.\*** Rapid Directed Molecular Evolution of Fluorescent Proteins in Mammalian Cells. *Protein Sci.* 2021, 15, 16. (co-corresponding).
- Subach, O. M., Vlaskina, A. V., Agapova, Y. K., Dorovatovskii, P. V., Nikolaeva, A. Y., Ivashkina, O. I., Popov, V. O., **Piatkevich, K. D.**, Khrenova, M. G., Smirnova, T. A., Boyko,

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- K. M., Subach, F. V. LSSmScarlet, dCyRFP2s, dCyOFP2s and CRISPRed2s, Genetically Encoded Red Fluorescent Proteins with a Large Stokes Shift. *Int. J. Mol. Sci.* 2021, 22, 2887.
- Xiao, S., Lowet, E., Gritton, H. J., Fabris, P., Wang, Y., Sherman, J., Mount, R. A., Tseng, H., Man, H.-Y., Straub, C., **Piatkevich, K. D.**, Boyden, E. S., Mertz, J., and Han, X. Large-scale voltage imaging in behaving mice using targeted illumination. *iScience* 2021, 24, 103263.
  - Wang, Y., Zhu, D., Liu, B. & **Piatkevich, K. D.\*** Craniotomy Procedure for Visualizing Neuronal Activities in Hippocampus of Behaving Mice. *Journal of Visualized Experiments* 2021. e62266. (\*corresponding)
  - Gao R., Yu C.-C., Gao, L., **Piatkevich K.D.**, Neve R.L., Munro J.B., Upadhyayula S., and Boyden, E.S. A highly homogeneous polymer composed of tetrahedron-like monomers for high-isotropy expansion microscopy *Nat. Nanotechnol.* 2021. 3, 12.
  - Qian Y., Cosio D. M. O., **Piatkevich K. D.**, Aufmkolk S., Su W.-C., Celiker O. T., Schohl A., Murdock M. H., Aggarwal A., Chang Y.-F., Wiseman P. W., Ruthazer E. S., Boyden E. S., Campbell R. E. Improved Genetically Encoded Near-Infrared Fluorescent Calcium Ion Indicators for in Vivo Imaging. *PLOS Biol.* 2020, 18 (11), e3000965.
  - Linghu C., Johnson S.L., Valdes P.A., Shemesh O.A., Park W.M., Park D., **Piatkevich K.D.**, Wassie A.T., Liu Y., An B., Barnes S.A., Celiker O.T, Yao C.-C., Yu C.C., Wang R., Adamala K.P., Bear M.F., Keating A.E., Boyden E.S. Spatial Multiplexing of Fluorescent Reporters for Imaging Signaling Network Dynamics, *Cell* 2020, 183(6), 1682-1698.e24.
  - O.A. Shemesh\*, C. Linghu\*, **K.D. Piatkevich\***, D. Goodwin, O.T. Celiker, H.J. Gritton, M.F. Romano, R. Gao, C.-C. Yu, H.A. Tseng, S. Bensussen, S. Narayan, C.-T. Yang, L. Freifeld, C.A. Siciliano, I. Gupta, J. Wang, N. Pak, Y.-G. Yoon, J.F.P. Ullmann, B. Guner-Ataman, H. Noamany, Z.R. Sheinkopf, W.M. Park, S. Asano, A.E. Keating, J.S. Trimmer, J. Reimer, A. Tolias, M.F. Bear, K.M. Tye, X. Han, M.B. Ahrens, E.S. Boyden. Precision calcium imaging of dense neural populations via a cell body-targeted calcium indicator. *Neurons*, 2020 107 (3), 470-486. e11 (\*equal contribution).
  - L.Z. Fan, S. Kheifets, U.L. Böhm, H. Wu, **K.D. Piatkevich**, M.E. Xie, V. Parot, Y. Ha, K.E. Evans, E.S. Boyden, A.E. Takesian, A.E. Cohen. All-optical electrophysiology reveals the role of lateral inhibition in sensory processing in cortical layer 1. *Cell* 2020, 180 (3), 521-535.
  - O.M. Subach, V.P. Sotskov, V.V. Plusnin, A.M. Gruzdeva, N.V. Barykina, O.I. Ivashkina, K.V. Anokhin, A.Y. Nikolaeva, D.A. Korzhenevskiy, A.V. Vlaskina, V.A. Lazarenko, K.M. Boyko, T.V. Rakitina, A.M. Varizhuk, G.E. Pozmogova, O.V. Podgorny, **K.D. Piatkevich**, E.S. Boyden, F.V. Subach. Novel Genetically Encoded Bright Positive Calcium Indicator NCaMP7 Based on the mNeonGreen Fluorescent Protein. *International Journal of Molecular Sciences*, 2020 21 (5), 1644.
  - **K.D. Piatkevich\***, S. Bensussen\*, H. Tseng\*, S.N. Shroff, V.G. Lopez-Huerta, D. Park, E.E. Jung, O.A. Shemesh, C. Straub, H.J. Gritton, M.F. Romano, E. Costa, B.L. Sabatini, Z.Fu, E.S. Boyden, X. Han. Population imaging of neural activity in awake behaving mice. *Nature*, 2019 574 (7778), 413-417 (\*equal contribution).
  - Y. Qian\*, **K.D. Piatkevich\***, B. McLarney\*, A.S. Abdelfattah, S. Mehta, S. Gottschalk, R.S. Molina, W. Zhang M. Drobizhev, T.E. Hughes, J. Zhang, E.R. Schreiter, S. Shoham, D. Razansky, E.S. Boyden, and R.E. Campbell. A Genetically-Encoded Near-Infrared

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Fluorescent Calcium Ion Indicator. *Nature Methods*, 2019 16 (2), 171-174 (\*equal contribution).

- O.M. Subach, N.V. Barykina, K.V. Anokhin, **K.D. Piatkevich**, F.V. Subach. Near-infrared genetically encoded positive calcium indicator based on GAF-FP bacterial phytochrome. *International Journal of Molecular Sciences*, 2019 20 (14), 3488
- O.M. Subach, T.A. Kunitsyna, O.A. Mineyeva, A.A. Lazutkin, D.V. Bezryadnov, N.V. Barykina, **K.D. Piatkevich**, Y.G. Ermakova, D.S. Bilan, V.V. Belousov, K.V. Anokhin, G.N. Enikolopov, F. V. Subach. Slowly reducible genetically encoded green fluorescent indicator for in vivo and ex vivo visualization of hydrogen peroxide. *International Journal of Molecular Sciences*, 2019, 20 (13), 3138.
- N.V. Barykina, D.A. Doronin, O.M. Subach, V.P.Sotskov, V.V. Plusnin, O.A. Ivleva, A.M. Gruzdeva, T.A. Kunitsyna, O.I. Ivashkina, A.A. Lazutkin, A.Y. Malyshev, I.V. Smirnov, A.M. Varizhuk, G.E. Pozmogova, **K.D. Piatkevich**, K.V. Anokhin, G.N. Enikolopov, F.V. Subach. NTnC-like genetically encoded calcium indicator with a positive and enhanced response and fast kinetics. *Scientific Reports*, 2018 8 (1), 15233.
- **Piatkevich K.D.\***, Jung E.E.\*, Straub C., Linghu C., Park D., Suk H.J., Hochbaum D.R., Goodwin D., Pnevmatikakis E., Pak N., Kawashima T., Yang C.-T., Rhoades J.L., Shemesh O., Asano S., Yoon Y.-G., Freifeld L., Saulnier J., Riegler C., Engert F., Hughes T., Drobizhev M., Szabo B., Ahrens M.B., Flavell S.W., Sabatini B.L., E.S. Boyden. Robotic multidimensional directed evolution of proteins: development and application to fluorescent voltage reporters. *Nature Chemical Biology*, 2018. 14 (4), 352. (\*equal contribution).
- Doronin D., Barykina N., Subach O., Isaakova E., Varizhuk A., Pozmogova G., **Piatkevich K.**, Anokhin K., Enikolopov G., Subach F. Genetically encoded calcium indicator with NTnC-like design and enhanced fluorescence contrast. *BMC Biotechnology*, 2018. **18** (1), 10.
- Shemesh O.A., Tanese D., Zampini V., Linghu C., **Piatkevich K.**, Ronzitti E., Papagiakoumou E., Boyden E.S., Emiliani V. Temporally precise single-cell resolution optogenetics. *Nature Neuroscience*. 2017. 20(12), 1796-1806.
- **Piatkevich K.D.**, Suk H.J., Suhasa B.K., Yoshida F., DeGennaro E.M., Drobizhev M., Hughes T.E., Desimone R., Boyden E.S., Verkhusha V.V. Near-infrared fluorescence proteins engineered from bacterial phytochromes in neuroimaging. *Biophys. J.* 2017. 113(10), 2299-2309.
- Barykina N.V., Subach O.M., **Piatkevich K.D.**, Jung E.E., Malyshev A.Y., Smirnov I.V., Bogorodskiy A.O., Borshchevskiy V.I., Varizhuk A.M., Pozmogova G.E., Boyden E.S., Anokhin K.V., Enikolopov G.N., Subach F.V. Green fluorescent genetically encoded calcium indicator based on calmodulin/M13-peptide from fungi. *PLoS One*. 2017; 12(8):e0183757.
- Rowlands C.J., Park D., Bruns O.T., **Piatkevich K.D.**, Fukumura D., Jain R.K., Bawendi M.G., Boyden E.S., So P.T.C. Wide-field three-photon excitation in biological samples. *Light: Science & Applications*. 2017, 6, e16255;
- Barykina N.V., Subach O.M., Doronin D.A., Sotskov V.P., Roshchina M.A., Kunitsyna T.A., Malyshev A.Y., Smirnov I.V., Azieva A.M., Sokolov I.S., **Piatkevich K.D.**, Burtsev M.S., Varizhuk A.M., Pozmogova G.E., Anokhin K.V., Subach F.V., Enikolopov G.N. A new design for a green calcium indicator with a smaller size and a reduced number of calcium-binding sites. *Scientific Reports*. 2016, 6:34447.

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- Konold P.E., Yoon E., Lee J., Allen S.L., Chapagain P.P., Gerstman B.S., Regmi C.K., **Piatkevich K.D.**, Verkhusha V.V., Joo T., Jimenez R. Fluorescence from multiple chromophore hydrogen-bonding states in the far-red protein TagRFP675. *J. Phys. Chem. Lett.*, 2016. 7, 3046-3051
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- Randino C., Gelabert R., Moreno M., Lluch J.M., **Piatkevich K.D.** Molecular modelling of the pH influence in the geometry and the absorbance spectrum of near-infrared TagRFP675 fluorescent protein. *Phys Chem Chem Phys.* 2015. 17:29363.
- **Piatkevich K.D.**, English B.P., Malashkevich V.N., Xiao H., Almo S.C., Singer R.H., Verkhusha V.V. Photoswitchable red fluorescent protein with a large Stokes shift. *Chem Biol.* 2014. 21:1402.
- **Piatkevich K.D.**, Subach F.V., Verkhusha V.V. Far-red light photoactivatable near-infrared fluorescent proteins engineered from a bacterial phytochrome. *Nat Commun.* 2013. 4: 2153.
- **Piatkevich K.D.**, Malashkevich V.N., Morozova K.S., Nemkovich N.A., Almo S.C. and Verkhusha V.V. An extended Stokes shift in fluorescent proteins: chromophore-protein interactions in the near-infrared TagRFP675 variant. *Sci Rep.* 2013. 3: 1847.
- **Piatkevich K.D.**, Hult J., Subach O.M., Wu B., Abdulla A., Segall J.E., Verkhusha V.V. Monomeric red fluorescent proteins with a large Stokes shift. *Proc Natl Acad Sci USA* 2010. 107: 5369-5374.
- **Piatkevich K.D.**, Malashkevich V.N., Almo S.C., Verkhusha V.V. Engineering ESPT pathways based on structural analysis of LSSmKate red fluorescent proteins with large Stokes shift. *J Am Chem Soc.* 2010. 132: 10762-10770.
- Filonov G.S., **Piatkevich K.D.**, Ting L.M., Zhang J., Kim K., Verkhusha V.V. Bright and stable near-infrared fluorescent protein for in vivo imaging. *Nat Biotechnol.* 2011 29: 757-61.
- Morozova K.S., **Piatkevich, K.D.**, Gould T.J., Zhang J., Bewersdorf J. and Verkhusha V.V. Far-red fluorescent protein excitable with red lasers for flow cytometry and superresolution STED nanoscopy. *Biophys. J.* 2010. 99: 13-15.
- Subach O.M., Malashkevich V.N., Zencheck W.D., Morozova K.S., **Piatkevich K.D.**, Almo S.C., and Verkhusha V.V. Structural characterization of acylimine-containing blue and red chromophores in mTagBFP and TagRFP fluorescent proteins. *Chem. Biol. (Cell press)* 2010. 17: 333-341.
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*Manuscripts in preparation:*

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- **Piatkevich K.D.**, Apkhazava D., Shen Y. Simultaneous imaging of intracellular chloride concentration and pH with high temporal resolution in neurons in vivo.
- **Piatkevich K.D.**, Estandian D., Boyden E.S. Comprehensive guide to optogenetics. *Invited review*.

*Review Articles and Chapters in Books:*

- **Piatkevich, K. D.\***, & Boyden, E. S.\* Optogenetic Control of Neural Activity: the Biophysics of Microbial rhodopsins in Neuroscience. *Quarterly Reviews of Biophysics*. 2023. 1–81.
- Zhao, S., **Piatkevich, K. D.\*** Techniques for in vivo serotonin detection in the brain: State of the art. *J. Neurochem*. 2023. 166(3), 453–480
- Sneve, M. A. & **Piatkevich, K. D.\*** Towards a Comprehensive Optical Connectome at Single Synapse Resolution via Expansion Microscopy. *Front. Synaptic Neurosci*. 2021, 70 (\*corresponding).
- **Piatkevich K.D.\***, Murdock M.H., Subach F.V.\* Advances in engineering and application of optogenetic indicators for neuroscience. *Appl. Sci*. 2019, 9(3), 562. (\*co-corresponding).
- **Piatkevich K.D.**, Subach F.V., Verkhusha V.V. Engineering of bacterial phytochromes for near-infrared imaging, sensing, and light-control in mammals. *Chemical Society Reviews*. 2013. 42(8):3441-52.
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- Subach F.V.\*, **Piatkevich K.D.\***, Verkhusha V.V. Directed molecular evolution to design advanced red fluorescent proteins. *Nat Methods* 2011, 8:1019-26. (\*equal contribution).
- **Piatkevich K.D.**, Verkhusha V.V. Guide to red fluorescent proteins and biosensors for flow cytometry. *Methods in Cell Biology*. 2011. 102:431-461.
- **Piatkevich, K.D.**, Verkhusha, V.V. Advances in engineering of fluorescent proteins and photoactivatable protein with red emission. *Curr. Opin. Chem. Biol*. 2010. 14: 23-29.
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**PATENTS:**

- **Kiryl Piatkevich**, Tiannan Guo, Li Lu, Cuiji Sun, Yaoting Sun, Yi Zhu, Expansion Proteomics, application submitted August 27th, 2021. Application No.: 202110994923.3
- **Kiryl Piatkevich**, Cuiji Sun, Methods for Reversible and Tunable Physical Expansion of Biological Samples, application submitted June 15th, 2021. Application No.: 202110659668.7
- Chinese application (**Kiryl Piatkevich**, Chenlei Gu, Hanbin Zhang, A Detection Method for Determining Concentration of Selected Ions in the Cell, Domestic Patent, Application date: May 13th, 2021; Application Number: 2021105209850

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- Xu G., Boyden E., **Piatkevich K.D.**, Adamala K. Spatial multiplexing for multisignal cellular imaging. 2016, US, 15/099,232.
- **Piatkevich K.D.**, Jung. E.E., Boyden E. Genetically red fluorescent voltage sensors enabling millivolt-resolution and high-speed neural voltage imaging. 2018. US, 16/026,551.
- Apkhazava D., **Paitkevich K.D.** Simultaneous measurement of halide ion concentration and pH. *Pending*.
- **Piatkevich K.D.**, Jung E.E., Boyden E.S. Directed molecular evolution of fluorescent proteins via robotic cell picking. *In preparation*.

**INVITED/SELECTED TALKS AND SEMINARS:**

44. **Piatkevich K.D.**, Advanced Methods and Probes for Analysing the Brain and Other Complex Systems, *Invited Seminar*, Chinese Institute for Brain Research, December 2023.
47. **Piatkevich K.D.**, Spatially Resolved Proteomics: Principles and Practices, *Invited Lecture* at Proteomics Workshop by Westlake Omics, Hangzhou, December 2023.
46. **Piatkevich K.D.**, A Suite of Novel Probes and Methods for Monitoring Signaling Pathways, *Selected Talk*, OptoRevolution: Exploring the Frontiers of Physiology with Light, Sanya, November 2023.
45. **Piatkevich K.D.**, Hydrogel-based tissue transformation methods for spatially resolved untargeted proteomics, *Selected Talk*, EMBL Conference: Proteomics in cell biology and disease mechanisms, Heidelberg, October 2023.
44. **Piatkevich K.D.**, A Suite of Novel Probes and Methods for Monitoring Signaling Pathways, *Invited Talk*, Janelia Fluorescent Proteins Conference, Janelia Farm Research Campus, September 2023.
43. **Piatkevich K.D.**, Spatially Resolved Proteomics: Principles and Practices, *Invited Lecture* at Proteomics Workshop by Westlake Omics and ThermoFisher, Hangzhou, August 2023.
42. **Piatkevich K.D.**, Fluorescence Microscopy: Principles, Practical Considerations, and Applications, *Invited Lecture* at Fluorescence Microscopy Workshop, August 2023.
41. **Piatkevich K.D.**, Solving the Brain – Engineering the Future, *Invited Lecture*, Westlake University Pre-College Program, Hangzhou, July 2023.
40. **Piatkevich K.D.**, Solving the Brain – Engineering the Future, *Invited Lecture*, Westlake University Summer Camp, Hangzhou, July 2023.
39. **Piatkevich K.D.**, Spatially Resolved Untargeted Proteomics, *Invited Talk*, The Westlake, Tsinghua, SUST Inter-Institutional Conference, Shenzhen, February 2023.
38. **Piatkevich K.D.**, Multimodal Expansion Microscopy, *Invited talk* at Westlake Proteomics Series G15, November 2022.
37. **Piatkevich K.D.**, Novel Hydrogel-Based Tissue Transformation Methods for Super-Resolution Imaging and Untargeted Proteomics, *Online talk* at the 29th FAOBMB & the 2022 CSBMB Online Conference, October 2022.
36. **Piatkevich K.D.**, Novel Tools for Analyzing the Brain and Other Complex Systems, *Invited lecture* at Frontiers in Neuroscience Seminar, Fudan University, October 2022.



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35. **Piatkevich K.D.**, Spatially Resolved Proteomics via Hydrogel-Based Tissue Transformation, *Invited talk* at Westlake Omics Seminar, October 2022.
34. **Piatkevich K.D.**, Fluorescence Microscopy: Principles, Practical Considerations, and Applications, *Invited Lecture* at Fluorescence Microscopy Workshop, September 2022.
33. **Piatkevich K.D.**, Why I Like Being a Scientist, *Invited talk*, Summer School at Westlake University, August 2022.
32. **Piatkevich K.D.**, Expansion Microscopy: Principles and Applications, *Invited lecture* at the Octa-ExM workshop, July 2022.
31. **Piatkevich K.D.**, How Baby Diapers Can Help Us Study the Brain, *Invited talk* at TEDxYouth, May 2022.
30. **Piatkevich K.D.**, CellPicker-Assisted Directed Molecular Evolution, *Invited talk* at Single cell online seminar, April 2022.
29. **Piatkevich K.D.**, Development of advanced bio-imaging techniques. *Conference talk* at Prevention and Control of Infectious Diseases from the Perspective of One Health, China, September 2021.
28. **Piatkevich K.D.**, Development of advanced fluorescent probes for structural and functional imaging of biological systems, *Invited Seminar*, Institute of Neuroscience, Zhejiang University School of Medicine, China, July 2021.
27. **Piatkevich K.D.**, Development of advanced fluorescent probes for structural and functional imaging of biological systems, *Invited Lecture*, IDG/McGovern Institute for Brain research at Tsinghua University, China, June 2021.
26. **Piatkevich K.D.**, Engineering Scalable Tools for Mapping Brain Computations, *Invited Seminar*, Department of Bioengineering, Zhejiang University, China, April 2021.
25. **Piatkevich K.D.**, Engineering Scalable Tools for Mapping Brain Computations, *Invited Seminar*, Institute of Neuroscience of Chinese Academy of Science, China, January 2021.
24. **Piatkevich K.D.**, Engineering Scalable Tools for Mapping Brain Computations, *PKU-JNC Joint Neurotechnology & Discovery Series*, September 2020.
23. **Piatkevich K.D.**, Reverse Engineering the Brain, *Tencent Collaboration meeting*, Westlake University, China, July 2020.
22. **Piatkevich K.D.**, Solving the Brain – Engineering the Future, *FLADY Sorority meeting*, Westlake University, China, July 2020.
21. **Piatkevich K.D.**, Development of advanced fluorescent probes for structural and functional imaging of biological systems, *Interdisciplinary PI Lunch Seminar*, Westlake University, China, March 2020.
20. **Piatkevich K.D.**, Engineering tools for mapping brain computations, *Invited Lecture*, Imperial College London, UK, December 2019.
19. **Piatkevich K.D.**, Engineering scalable tools for mapping brain computations, *Invited Lecture*, Department of Physics, Zhejiang University, China, November 2019.
18. **Piatkevich K.D.**, Engineering scalable tools for mapping brain computations, *Invited Lecture*, HUST – Suzhou Institute for Brainsmatics, China, November 2019.
17. **Piatkevich K.D.**, Solving the Brain – Engineering the Future, *Keynote Speaker*, Westlake

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University Forum, China, October 2019.

16. **Piatkevich K.D.**, Genetically encoded indicators of neuronal activity, *Invited Lecture*, University of Minnesota, USA, September 2019.
15. **Piatkevich K.D.**, Engineering scalable tools for mapping brain computations, *Multiphoton Workshop*, Montana State University, USA, August 2019.
14. **Piatkevich K.D.**, Engineering scalable tools for mapping brain computations, *Invited Special Seminar*, Westlake University, China, March 2019.
13. **Piatkevich K.D.**, Engineering scalable tools for mapping brain computations, *Invited Special Seminar*, Center for Brain Sciences, RIKEN, Japan, February 2019.
12. **Piatkevich K.D.**, Mapping neuronal computation in zebrafish brain, *Imaging Structure and Function of the Zebrafish Brain*, Brighton, UK, December 2018.
11. **Piatkevich K.D.**, Population voltage imaging in vivo. *45+1th Merocyanine 540*, Woods Hole, USA, August 2018.
10. **Piatkevich K.D.**, Voltage imaging and associated signal processing. *Invited talk*, Toshiba Collaboration meeting, Boston, USA, October 2018.
9. **Piatkevich K.D.**, Genetically encoded near-infrared fluorescent probes for in vivo imaging. *256th ACS National Meeting*, Boston, USA, August 2018.
8. **Piatkevich K.D.**, Engineering scalable tools for solving the brain. *Invited Special Seminar*, University of California Riverside, USA, February 2018.
7. **Piatkevich K.D.**, Population voltage imaging with single-cell millivolt resolution. *Brain and Cognitive Sciences Retreat*, Newport, USA, June 2017.
6. **Piatkevich K.D.**, Voltage imaging with subcellular and subthreshold resolution using novel genetically encoded voltage reporters, *MIT Plastic lunch*, USA, October 2016.
5. **Piatkevich K.D.**, Engineering tools for mapping brain computations. *Junior Scientists workshop on "Protein Engineering: Making and Using Tools for Neuroscience and Other Biological Problems"*, Janelia Research Campus, USA, March 2016.
4. **Piatkevich K.D.**, Development and application of advanced fluorescent proteins. *Invited Seminar*, Harvard Medical School, USA, February 2013.
3. **Piatkevich K.D.**, Development and application of novel monomeric fluorescent proteins. *Invited Seminar*, Massachusetts Institute of Technology, USA, April 2012.
2. **Piatkevich K.D.**, Photoactivatable near-infrared fluorescent protein designed from a bacterial phytochrome for in vivo imaging. *Work in Progress Seminar*, Albert Einstein College of Medicine, USA, February 2012.
1. **Piatkevich K.D.**, Recent advances in engineering and application of GFP-like red fluorescence proteins. *Invited Seminar*, Lomonosov Moscow State University, Russia, March 2011.

## TEACHING:

Teaching "Neurobiology" course for graduate students at Westlake University.

Trained and supervised multiple undergraduate and graduate students from MIT (2013-2019).

Developed and taught course "Chemistry of black and white photography" at SigmaCamp for

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middle and high school students (2012-2014).

Teaching Assistant for Protein and Gene Engineering class at MSU; taught 15-student section (2010).

**PROFESSION SERVICE:**

- 1. Guest Editor for Special Issue "Development and Application of Super-Resolution Imaging Methods for Biological Research" at International Journal of Molecular Sciences (4 papers published).
- 2. Guest Editor for Special Issue "Development and Application of Super-Resolution Imaging Methods for Biological Research" at International Journal of Molecular Sciences (2 papers published).
- 3. Guest Editor for Special Issue "Advanced Fluorescent Probes for Structural and Functional Imaging of Biological Systems" at International Journal of Molecular Sciences (11 papers published)
- 4. Guest Editor for Special Issue "Advanced Fluorescent Probes for Structural and Functional Imaging of Biological Systems 2.0" at International Journal of Molecular Sciences (7 papers published)
- 5. Topic Editor for Large-scale Recording of Neuronal Activity at High Spatiotemporal Resolutions and Applications in Neuroscience Issue at Frontiers in NEUROSCIENCE
- 6. Review Editor on the Editorial Board of Biosensors and Biomolecular Electronics (specialty section of Frontiers in Bioengineering and Biotechnology <https://www.frontiersin.org/journals/bioengineering-and-biotechnology>);
- 7. Reviewing manuscripts for Science, Nature Communication, Journal of Neurochemistry, International Journal of Molecular Sciences.