


## Education


- Ph.D. student, Northwestern University, Chicago, USA 2022–present  
Driskill Graduate Program in Life Sciences
- M.S. in Bioinformatics, Newcastle University, Newcastle upon Tyne, UK 2017–2018  
*With distinction*  
Dissertation: Evaluation of machine learning strategies for classification and unbiased discovery of the new cell types in the single cell RNA-seq datasets  
Advisors:  
— Jaume Bacardit, Reader at Newcastle University;  
— Alexander Misharin, Assistant Professor at Northwestern University.
- Undergraduate coursework in Biology, Moscow State University, Moscow, Russia 2003–2006  
Genetics major


## Publications

- Rogan A. Grant\*, Luisa Morales-Nebreda\*, **Nikolay S. Markov\***, Suchitra Swaminathan, Estefany R. Guzman, Darryl A. Abbott, ... Ankit Bharat, Cara J. Gottardi, GR Scott Budinger, Alexander V. Misharin, Benjamin D. Singer, Richard G. Wunderink, The NU SCRIPT Study Investigators  
Circuits between infected macrophages and T cells in SARS-CoV-2 pneumonia. *Nature*, 2021; 590, 635–641. <https://doi.org/10.1038/s41586-020-03148-w>   
\* equally contributing first co-author
- Marc A Sala\*, **Nikolay S. Markov\***, Yuliya Politanska, Hiam Abdala-Valencia, Alexander V Misharin, Manu Jain  
Expression of ACE2—A Key SARS-CoV-2 Entry Factor—Is Not Increased in the Nasal Mucosa of People with Cystic Fibrosis. *American Journal of Respiratory Cell and Molecular Biology*, 2022.  
<https://doi.org/10.1165/rcmb.2021-0341LE>   
\* equally contributing first co-author
- L. Sikkema, D. Strobl, L. Zappia, E. Madissoon, **N.S. Markov**, ... A.V. Misharin, M.C. Nawijn, M.D. Luecken, F. Theis  
An integrated cell atlas of the human lung in health and disease. *bioRxiv*, 2022.  
<https://doi.org/10.1101/2022.03.10.483747> 
- Ankit Bharat, Melissa Querrey, **Nikolay S. Markov**, Samuel Kim, Chitaru Kurihara, Rafael Garza-Castillon, Adwaiy Manerikar, Ali Shilatifard, Rade Tomic, Yuliya Politanska, Hiam Abdala-Valencia, Anjana V. Yeldandi, Jon W. Lomasney, Alexander V. Misharin, G.R. Scott Budinger  
Lung transplantation for pulmonary fibrosis secondary to severe COVID-19. *Science Translational Medicine*, 2020. <https://doi.org/10.1126/scitranslmed.abe4282> 
- Satoshi Watanabe, **Nikolay S. Markov**, Ziyang Lu, Raul Piseaux Aillon, Saul Soberanes, Constance E. Runyan, Ziyang Ren, Rogan A. Grant, Mariana Maciel, Hiam Abdala-Valencia, Yuliya Politanska, ... Richard I. Morimoto, Paul A. Reyfman, G.R. Scott Budinger, Alexander V. Misharin  
Resetting proteostasis with ISRIB promotes epithelial differentiation to attenuate pulmonary fibrosis. *PNAS*, 2021; 118 (20) e2101100118. <https://doi.org/10.1073/pnas.2101100118> 
- Masahiro Yoshida, Kaylee B. Worlock, Ni Huang, Rik G.H. Lindeboom, ... **NU SCRIPT Study Investigators\***, ... Alexander V. Misharin, Sam M. Janes, Sarah A. Teichmann, Marko Z. Nikolić, Kerstin B. Meyer  
Local and systemic responses to SARS-CoV-2 infection in children and adults. *Nature*, 2022; 602 321–327. <https://doi.org/10.1038/s41586-021-04345-x>   
\* part of the collective author


Clarissa M. Koch, Andrew D. Prigge, Kishore R. Anekalla, Avani Shukla, Hanh Chi Do-Umehara, Leah Setar, Jairo Chavez, Hiam Abdala-Valencia, Yuliya Politanska, **Nikolay S. Markov**, ... Alexander V. Misharin, Karen M. Ridge, Bria M. Coates


Age-related Differences in the Nasal Mucosal Immune Response to SARS-CoV-2. *American Journal of Respiratory Cell and Molecular Biology*, 2021; volume 66 issue 2.  
<https://doi.org/10.1165/rcmb.2021-0292OC> 

Matthew L. Speir, Aparna Bhaduri, **Nikolay S. Markov**, Pablo Moreno, Tomasz J. Nowakowski, Irene Papatheodorou, Alex A. Pollen, Brian J Raney, Lucas Seninge, W. James Kent, Maximilian Haeussler  
UCSC Cell Browser: visualize your single-cell data. *Bioinformatics*, 2021.  
<https://doi.org/10.1093/bioinformatics/btab503> 


Luisa Morales-Nebreda, Kathryn A. Helmin, **Nikolay S. Markov**, Raul Piseaux, Manuel A. Torres Acosta, Hiam Abdala-Valencia, Yuliya Politanska, Benjamin D. Singer  
Aging imparts cell-autonomous dysfunction to regulatory T cells during recovery from influenza pneumonia. *JCI Insight*, 2021. <https://doi.org/10.1172/jci.insight.141690> 

Constance E. Runyan, Lynn C. Welch, Emilia Lecuona, Masahiko Shigemura, Luciano Amarelle, Hiam Abdala-Valencia, Nikita Joshi, Ziyang Lu, Kiwon Nam, **Nikolay S. Markov**, ... G. R. Scott Budinger, Jacob I. Sznajder, Alexander V. Misharin

Impaired phagocytic function in CX3CR1<sup>+</sup> tissue-resident skeletal muscle macrophages prevents muscle recovery after influenza A virus-induced pneumonia in old mice. *Aging Cell*, 2020; 19:e13180.  
<https://doi.org/10.1111/acer.13180> 

Nikita Joshi, Satoshi Watanabe, Rohan Verma, Renea P. Jablonski, Ching-I Chen, Paul Cheresch, **Nikolay S. Markov**, Paul A. Reyfman, ... G.R. Scott Budinger, Alexander V. Misharin  
A spatially restricted fibrotic niche in pulmonary fibrosis is sustained by M-CSF/M-CSFR signalling in monocyte-derived alveolar macrophages. *European Respiratory Journal*, 2020; 55 (1) 1900646.  
<https://doi.org/10.1183/13993003.00646-2019> 

## Invited talks

Circuits between infected macrophages and T cells in SARS-CoV-2 pneumonia June 2021  
American Thoracic Society Allergy, Immunology and Inflammation (AII) assembly journal club. [Recording](#) 

## Work Experience

Post-Baccalaureate Research Fellow, Division of Pulmonary and Critical Care, Feinberg School of Medicine, Northwestern University, Chicago, USA	2019–2022
Analyse transcriptomic data from human samples and mouse experiments to gain insights into COVID-19, pulmonary fibrosis, systemic sclerosis and other pulmonary diseases. Analyse clinical data to correlate -omics data to clinical states and effects of treatment. Write manuscripts, support and organize data exchange, data management infrastructure, survey and apply new tools to RNA-seq analysis, develop in-house algorithms, design biological experiments to test hypothesis generated from analysis of transcriptomic data.	
Head of maintenance tools development group, Yandex, Moscow, Russia	2014–2017
Develop, design and support web-services and console tools for system administrators and other employees. Manage a team of developers on these projects: mentor, resolve conflicts, improve performance, code review.	
Full-stack software engineer, Yandex, Moscow, Russia	2007–2014
Develop, design and support web-services and console tools for automating and improving employees' workflows.	
Software engineer, Art. Lebedev Studio, Moscow, Russia	2006–2007
Develop and support web-sites and content management system.	

## Honors and awards

Northwestern Institute on Complex Systems Data Science Fellow	2022
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
## Teaching Experience

Summer Students Program 2022 at Division of Pulmonary and Critical Care Co-mentored 1 college student in automated imaging analysis of healthy donor and fibrotic lung sections stained with immunohistochemistry and RNAscope assays to detect alveolar macrophage subtypes and their localizations. Helped develop project goals, methodology and results interpretation.	2022
Summer Students Program 2020 at Division of Pulmonary and Critical Care Oversaw a group of 4 college students on a bioinformatics project of analysis of single-cell bronchial brushing samples in a remote setting during the 4-week Summer Students Program. Contributed to project's design, teaching R programming environment, single-cell RNA-seq experimental technology, single-cell analysis software (Seurat), mentoring and troubleshooting.	2020
Introduction to Python, Introduction to Pandas and Matplotlib Small introductory lecture series during Data Science Nights at NICO, Northwestern University.	2020
Introduction to Programming, Newcastle University, Newcastle upon Tyne, UK Unofficial 5-lecture course for fellow students.	2017
Introduction to Computer Science with Python 3, Yandex, Moscow, Russia High-school students.	2013

## Coursework

DGP 440 Immunology, Northwestern University Auditioned the course	2020
Evaluation of machine learning strategies for classification and unbiased discovery of the new cell types in the single cell RNA-seq datasets <i>M.S. thesis, Newcastle University.</i> Advisers: — Jaume Bacardit, Reader at Newcastle University; — Alexander Misharin, Assistant Professor at Northwestern University.  We evaluated the possibility of using machine learning methods to rapidly annotate new single cell RNA-seq datasets based on the reference dataset. We assessed the performance of a gradient boosting algorithm catboost for predicting cell types in Mouse Cell Atlas dataset and 3 samples of mouse lungs. We explored several strategies to explicitly train our models to detect novel cell types that are absent in the reference dataset. Catboost showed good performance, and was able to detect novel cell types while retaining good quality of cell type predictions. This demonstrated the possibility to use machine learning classification for unbiased high-throughput cell type discovery.	2018

## Miscellaneous

Open Problems for Single-Cell Analysis Jamboree <a href="https://openproblems.bio/jamboree/">https://openproblems.bio/jamboree/</a> 	March 2021
Contributions to single-cell RNA-seq open-source tools Seurat and CellBrowser, bioinformatics tool biopython	2018–present
Dataset visualisation for Reyfman <i>et al.</i> , 2019 for Northwestern University Create a website with interactive dataset visualisation for single-cell RNA-seq lung datasets from Reyfman <i>et al.</i> , 2019 using open-source tools.	2018

Lab system administrator, Polilov lab, Moscow State University, Moscow, Russia

2017–2019

Install and maintain software for connectome proofreading from Janelia Institute. Setup file sharing and backup for lab members.

## Programming languages

Python, R, Java, C++, Ruby, Perl. Linux. Latex. HTML, JS.

Github: <https://github.com/mxposed> 

## Personal Information

Spanish: basic; French: basic; Japanese: basic

Hobbies: piano, photography

Russian citizenship

Born in 1986