

ANATOLY BUCHIN, PhD

Computational Biology | Data Science | Machine Learning



+1 (206) 488 23 43



anat.buchin@gmail.com



LinkedIn: anatoly-buchin



Seattle, United States



www.buchin.info



www.github.com/abuchin

EDUCATION

PhD in Computational Neuroscience, École Normale Supérieure, Paris
2012–2015

Master of Physics, Peter the Great Polytechnic University, St Petersburg
2010–2011

Master of Biomedical Research, Descartes University, Paris
2009–2010

Bachelor of Physics, Peter the Great Polytechnic University, St Petersburg,
2005–2009

TECHNICAL SKILLS

Machine Learning & AI

Deep learning, Large Language Models (LLMs), generative models, probabilistic modeling, Bayesian inference, statistical learning, representation learning.

Computational Biology & Bioinformatics

Single-cell & bulk RNA-seq, Genomics, protein structure analysis, graph-based models for biological data

Model development

MLOps, CI/CD, data pipelines

Big Data & Cloud Computing

AWS (S3, EC2, Lambda), distributed computing, parallel processing, high-performance computing (HPC).

SOFTWARE SKILLS

Unix/Linux & DevOps

Shell scripting, Docker, Git, workflow automation

Distributed and cloud computing

AWS Cloud, SageMaker, Google cloud, HPC, GPU

Programming languages

Python, R, Matlab, Bash

Database management

SQLAlchemy, Athena, PostgreSQL

PROFILE

Innovative Applied Scientist with a PhD in Computational Neuroscience and extensive expertise in machine learning, deep learning, and high-dimensional data analysis. Proven ability to develop AI/ML models, analyze large-scale biological and multi-modal datasets, and integrate computational methods into real-world applications. Strong programming skills (Python, PyTorch, TensorFlow, scikit-learn) and cloud computing experience (AWS). Passionate about driving scientific innovation at scale, building new technologies, and translating research into impactful products. Experienced in deploying machine learning solutions in production environments, collaborating with cross-functional teams, and working in fast-paced innovative environment.

INDUSTRIES: Drug discovery, Biotechnology, GenAI

SENIOR SCIENTIST - AI/ML for Computational Biology

Synthesize Bio | Seattle | August 2024

- Leading the development of a foundational AI models for transcriptomics, generating artificial single-cell and bulk transcriptomics data for diverse human tissues.
- Evaluation of deep learning models (Variational Auto encoders, and probabilistic models) to simulate gene expression patterns.
- Implementing scalable pipelines on AWS for data processing, model training, and inference.
- Collaborating cross-functionally with engineers, biologists, and product teams to deploy machine learning solutions in production.

SENIOR SCIENTIST - Computational biology and Drug discovery

Cajal Neuroscience | Seattle | May 2021 - June 2024

- Developed ML models to predict cellular states based on gene expression patterns in single-cell RNA-seq datasets to advance drug discovery.
- Built data pipelines for large-scale genomics data processing, using Cell Ranger, Scanpy, and PyTorch for deep learning applications.
- Led bioinformatics analyses for human multi-omics data integration, supporting internal drug discovery programs.
- Deployed and managed AWS-based infrastructure for genomics data processing and storage on S3.

SCIENTIST I - Data Science & Bioinformatics

Allen Institute for Brain Science | Seattle | Apr 2017 - March 2021

- Designed high-throughput data analysis pipelines for neuronal morphology and transcriptomics data.
- Applied deep learning techniques to multi-modal neuroscience datasets to uncover new insights into brain function.
- Developed custom ML algorithms for pattern recognition in high-dimensional biological data.
- Collaborated with engineering teams to optimize large-scale data processing from simulations on HPC clusters.

SOFTWARE SKILLS

Data visualizations

Pyplot, Matplotlib, Seaborn

Machine learning frameworks

TensorFlow, PyTorch, Jax, Keras, scikit-learn, scvi-tools

Code development

Git, Github, Visual Studio, Anaconda

Containers and workflow managers

Docker, Singularity, Snakemake, Nextflow

AWARDS

2017 Assistant professor in neuroscience (France)

2016 NSF Travel grant

2016 Swartz Foundation fellowship

2014 Foundation of Medical Research grant

2011 Labex doctorate fellowship

2009 Foundation Bettencourt Shueller fellowship

LANGUAGES

ENGLISH – Full proficiency

FRENCH – Proficient

GERMAN – Proficient

RUSSIAN – Native speaker

MENTORSHIP

2022, Temitope Adeoye, University of Soth Florida, PhD student

2021, Sasha Batoukova, Tesla high school student

2018, Shao-An Yin, University of Washington, PhD student

REFERENCES

Ben Logsdon

Cajal Neuroscience

Costas Anastassiou

Cedars-Sinai Medical Center

Adrienne Fairhall

University of Washington

Boris Gutkin

Ecole Normalé Superieure

EXPERIENCE continued

POST-DOCTORAL RESEARCHER

University of Washington, | Seattle | February 2016 - April 2017

- Analyzed time series electrical recordings from epileptic human brain slices using computational modeling and non-linear dynamics.
- Developed novel neural network models to explain animal behavior in *Hydra vulgaris*.
- Implemented data analysis pipelines for in vivo calcium imaging data and applied motion tracking algorithms for video behavioral data.

DOCTORAL RESEARCHER

École Normale Supérieure, | Paris | January 2012 - November 2015

- Developed computational models for single neurons and neural networks based on time series data.
- Applied dynamical systems theory to explain brain dynamics in human epilepsy and rodent motor systems.
- Simulated biological neural network behavior based on neural network dynamics and reaction-diffusion modeling.

RESEARCH ASSISTANT

Ioffe Institute of Physics, | St Petersburg | September 2009 - January 2012

- Developed novel computational models of neural populations using statistical physics.
- Applied mean-field theory to explain the properties of neurons in the visual cortex.
- Presented research results at national conferences: Neuroinformatics.

SELECTED PUBLICATIONS

Buchin A., et al. (2022). Multi-modal characterization and simulation of human epileptic circuitry. *Cell Reports*. (**Paper** | **Code** | **Web product**)

Wei Y., **Buchin A.**, et al (2023). Associations between in vitro, in vivo and in silico cell classes in mouse primary visual cortex. *Nature communications*. (**Paper** | **Code**)

Nandi A., **Buchin A.** et al (2022). Single-neuron models linking electrophysiology, morphology and transcriptomics across cortical cell types. *Cell Reports*. (**Paper** | **Code** | **Web Product**)

Berg, J., **Buchin A.** et al, (2021). Human cortical expansion involves diversification and specialization of supragranular intratelencephalic-projecting neurons. *Nature*. (**Paper** | **Code**)

Kalmbach K.E., **Buchin A.** et al (2018). H-channels contribute to divergent electrophysiological properties of supragranular pyramidal neurons in human versus mouse cerebral cortex. *Neuron*. (**Paper** | **Code**)

Buchin A., et al (2018). Adaptation and inhibition control pathological synchronization in a model of focal epileptic seizure. *eNeuro*, 0019-18.2018. (**Paper** | **Code**)

Buchin A. et al. Reduced Efficacy of the KCC2 Cotransporter promotes epileptic oscillations in a subiculum network model. *Journal of Neuroscience*. (**Paper** | **Code**)

Buchin A. et al (2016). Inverse stochastic resonance in cerebellar Purkinje cells. *PLOS Computational Biology*. (**Paper** | **Code**)

SELECTED CONFERENCE PROCEEDINGS

Buchin A., et al Lineage tracing and differential expression analysis of single nuclei RNA-seq data from human neocortex identifies novel genes and pathways involved into progression of Alzheimer's disease. (2023). Alzheimer's and Parkinson's disease conference. Gothenburg, Sweden.

Buchin A., et al. Lineage tracing and differential expression analysis of single cell RNA-sequencing data from human midbrain identifies novel genes affected by idiopathic Parkinson's disease. (2022). Alzheimer's and Parkinson's disease conference. Barcelona, Spain.

Buchin A., et al (2019). Conserved and divergent electrophysiological and morphological properties of mouse and human transcriptomically-defined cell types. Chicago, United States.

Buchin A., et al (2018). Morpho-electric properties and computational simulation of human dentate gyrus granule cells from the epileptogenic hippocampus. Society for Neuroscience. San Diego, United States.