

# Shushan Toneyan

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## EDUCATION

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<b>Cold Spring Harbor Laboratory</b> <i>PhD Candidate in Biological Sciences</i>	2019 – Present
<b>University of Bern</b> <i>MSc in Bioinformatics and Computational Biology</i>	2017 - 2019
<b>University of Oxford</b> <i>BA in Biology, first-class diploma</i>	2014 - 2017

## RESEARCH EXPERIENCE

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<b>Peter Koo Lab at Colds Spring Harbor Laboratory</b> <i>PhD Candidate</i> <ul style="list-style-type: none"><li>Developing attention-based deep learning models to predict gene expression and epigenomic/chromatin features from DNA sequences</li><li>Developed a framework to comprehensively evaluate the generalization and interpretability of deep neural networks for genomics</li><li>Mentored an undergraduate researcher on a project that involved interpreting sequence features that drove predictions of chromatin structure from an existing deep learning model</li></ul>	2019 – Present
<b>Translational Research Unit at the University of Bern</b> <i>Research Assistant, MSc Candidate</i> <ul style="list-style-type: none"><li>Streamlined a graph edit distance based software for histopathology image analysis</li><li>Piloted pipelines for automating histopathology image-based diagnostics for clinical research and practice</li><li>Customized pipelines for pathologists to automate data and statistical analysis</li></ul>	2017-2019

## PUBLICATIONS AND CONFERENCES

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- Toneyan, S.**, Tang, Z., Koo, P., *Evaluating deep learning for predicting epigenomic profiles*. Nature Machine Intelligence. [accepted]
  - Gao, Y., He, X., Wu, X., Huang, Y., **Toneyan, S.**, Ipsaro, J., Ha, T., Koo, P., Egeblad, M., Joshua-Tor, L., and Vakoc, C., *ETV6 dependency in Ewing sarcoma through antagonism of EWS-FLI1- mediated enhancer activation*. Nature Cell Biology. [accepted]
  - Zhao, Y., Dukler, N., Barshad, G., **Toneyan, S.**, Danko, C. and Siepel, A., *Deconvolution of expression for nascent RNA-sequencing data (DENR) highlights pre-RNA isoform diversity in human cells*. Bioinformatics, 37(24), pp.4727-4736.
  - Studer, L., **Toneyan, S.**, Zlobec, I., Dawson, H. and Fischer, A., *Graph-based classification of intestinal glands in colorectal cancer tissue images*. MICCAI 2019 Workshop COMPAY.

## ADDITIONAL EXPERIENCE

### Conferences and other:

- Poster presentation at the Biology of Genomes 2022 at Cold Spring Harbor Laboratory, RSGDREAM 2022 (virtual)
- Reviewed papers for Nature Reviews Genetics and Bioinformatics, program committee at MLCB 2022
- Participant at the Oxford Machine Learning (OxML) summer school 2022 - fundamentals and health tracks (virtual), Machine Learning Summer School - MLSS 2021 Taipei (virtual)

### International Biology Olympiad (IBO):

- Co-organizer of the IBO 2022 in Armenia; lead the preparations and the discussions of the theoretical and practical tasks
- IBO national team mentor; Organized and lectured on topics in biostatistics and computational biology (2014-2017)
- Awarded bronze medal at IBO 2013 in Bern, Switzerland

## SKILLS

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**Analysis:** machine learning, model development (including transformers), interpretability, high performance computing, data processing

**Programming Languages and Tools:** Python, R, Bash scripting, Git

**Libraries:** Tensorflow, Pytorch

**Languages:** Armenian (native), English and Russian (fluent), German (intermediate)