

# Sameer Aryal

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CONTACT INFORMATION	Stanley Center for Psychiatric Research Broad Institute of MIT and Harvard 75 Ames St Cambridge, MA 02142	<i>Phone:</i> (413) 347-9726 <i>E-mail:</i> sameer.aryal@gmail.com <i>LinkedIn:</i> <a href="https://www.linkedin.com/in/sameer-aryal-nyu/">https://www.linkedin.com/in/sameer-aryal-nyu/</a> <i>Website:</i> <a href="http://www.sameeraryal.com">www.sameeraryal.com</a>
RESEARCH INTERESTS	Genome-scale neurogenetics; high-throughput examination of the mechanisms of gene expression in neural systems.	
EDUCATION	<b>New York University</b> , New York, NY Doctor of Philosophy, Basic Medical Science, August 2013 - May 2020 <ul style="list-style-type: none"><li>• Dissertation: “Molecular and computational examination of <i>de novo</i> protein synthesis in fragile X syndrome”</li><li>• Advisor: Eric Klann, Ph.D.</li></ul> <b>Williams College</b> , Williamstown, MA Bachelor of Arts, Biology (honors) and Economics, September 2008 - June 2012 <ul style="list-style-type: none"><li>• Dissertation: “The role of DopR neuronal circuits in regulating endogenous arousal in <i>D. melanogaster</i>”</li><li>• Advisor: Tim Lebestky, Ph.D.</li></ul>	
RESEARCH EXPERIENCE	<b>Broad Institute of MIT and Harvard</b> , Cambridge, MA <i>Postdoctoral Associate</i> <b>Oct 2020 - present</b> I am examining molecular and functional alterations in the brains of multiple mouse models of schizophrenia, bipolar disorder, and autism spectrum disorders using high-throughput transcriptomic, proteomic, and computational approaches. I am advised by Morgan Sheng, M.D., Ph.D. <b>New York University Center for Neural Science</b> , New York, NY <i>Graduate Research Assistant</i> <b>June 2014 - June 2020</b> Developed, implemented, and analyzed the results of various molecular and genome-wide assays, including ribosome profiling (Ribo-Seq) and translating ribosome affinity purification (Trap-Seq) to determine a mechanistic basis of elevated mRNA translation in the brain of a mouse model of fragile X syndrome. Also developed a novel assay to measure the rate of ribosome translocation in primary neurons. <b>A*STAR-Duke-NUS Neuroscience Research Partnership</b> , Singapore <i>Research Assistant</i> <b>Aug 2012 - May 2013</b> Wrote MATLAB scripts to analyze <i>D. melanogaster</i> motion-tracking datasets. Also authored a MATLAB library to visualize biological data via ‘estimation plots,’ which emphasize effect sizes rather than p-values. Won the Singapore International Pre-Graduate Award (SIPGA) to carry out this research in the Adam Claridge-Chang laboratory. <b>Williams College</b> , Williamstown, MA <i>Honors Student</i> <b>Sept 2011 - May 2012</b> Investigated which neuronal circuits regulate arousal, and how they are connected, in the <i>D. melanogaster</i> brain. Conditionally activated specific circuits in the fly brain by expressing the temperature-gated Transient Receptor Potential A1 (trpA1) channels in different subsets of neurons and then monitored the flies’ behavioral phenotypes through sleep and locomotor assays.	

## PUBLICATIONS

1. **Aryal S.**, Bonanno, K., Song, B., Mani, D. R., Keshishian, H., Carr, S. A., Sheng, M., Dejanovic, B. Deep proteomics identifies shared molecular pathway alterations in synapses of schizophrenia and bipolar disorder patients and mouse model. *Cell Reports*. 2023.
2. Longo F., **Aryal S.**, Anastasiades P., Maltese M., Baimel C., Albanese F., Tabor J., Zhu J., Oliveira M., Gastaldo D., Santini E., Tritsch N., Carter A., Klann E. Selective disruption of cortico-striatal circuitry results in repetitive and perseverative behaviors in fragile X syndrome model mice. *BioRxiv*. 2022.
3. Farsi, Z., Nicolella, A., Simmons, S. K., **Aryal, S.**, Shepard, N., Brenner, K., Lin, S., Herzog, L. E., Shin, W., Gazestani, V., Song, B., Bonanno, K., Keshishian, H., Carr, S. A., Macosko, E., Datta, S. R., Dejanovic, B., Kim, E., Levin, J. Z., Sheng, M. Brain region-specific changes in neurons and glia and dysregulation of dopamine signaling in Grin2a mutant mice. *BioRxiv*. 2022.
4. **Aryal, S.**, Longo, F., Klann, E. Genetic removal of p70 S6K1 corrects coding sequence length-dependent alterations in mRNA translation in fragile X syndrome mice. *Proceedings of the National Academy of Sciences of the United States of America*. 2021.
5. Longo F., Mancini M., Ibraheem P.L., **Aryal S.**, Mesini C., Patel J.C., Penhos E., Rahman N., Donohue M., Santini E., Rice M.E., Klann E. Cell-type-specific disruption of PERK-eIF2 $\alpha$  signaling in dopaminergic neurons alters motor and cognitive function. *Molecular Psychiatry*. 2021.
6. Ho, J., Tumkaya, T., **Aryal, S.**, Choi, H., Claridge-Chang, A. Moving beyond P values: data analysis with estimation graphics. *Nature Methods*. 2019.
7. Bowling, H., Bhattacharya, A., Zhang, G., [et al., including **Aryal, S.**], Klann, E. Altered steady state and activity-dependent de novo protein expression in fragile X syndrome. *Nature Communications*. 2019.
8. **Aryal, S.**, Klann, E. Turning up translation in fragile X syndrome. *Science*. 2018.
9. Mohammad, F., **Aryal, S.**, Ho, J., Stewart, J.C., Norman, N.A., Tan, T.L., Eisaka, A., Claridge-Chang, A. Ancient anxiety pathways influence Drosophila defence behaviors. *Current Biology*. 2016.

## HONORS AND AWARDS

- Awarded a *registration and travel scholarship* to attend the 2017 Summer Institute in Statistics for Big Data at University of Washington, Seattle. *April 2017*
- Inducted into *Sigma Xi* Scientific Research Society. *June 2012*
- Awarded *Robert L Gaudino Fellowship* at Williams College, MA to conduct independent Economics research on healthcare access in rural Nepal. *January 2010*
- Awarded *Brilliance in Nepal* by the British Council in Kathmandu for securing the highest marks in University of Cambridge Advanced-Level Biology examinations in entire Nepal in the May/June 2007 session. *April 2008*
- Graduated *valedictorian* from Budhanilkantha School, the national school of Nepal. *May 2007*

CONFERENCE  
PRESENTATIONS

- *Invited speaker*, Nanosymposium on “Neurodevelopmental Disorders - Mechanisms.” Society for Neuroscience Annual Meeting. 2017.
- *Invited speaker*, Annual Molecular Pharmacology Retreat. Sackler Institute at NYU School of Medicine. 2017.
- Presented posters describing my graduate research at:
  - Society for Neuroscience Annual Meeting. 2015, 2016, and 2018.
  - Molecular and Cellular Cognition Society Annual Meeting. 2015, 2016, and 2018.
  - Brains and Behavior: Order and Disorder in the Nervous System. Cold Spring Harbor Laboratories Symposium in Quantitative Biology. 2018.
  - RNA Therapeutics: From Base Pairs to Bedsides Symposium. 2018.

ADDITIONAL  
QUALIFICATIONS

- *Intern* at the Office of Industrial Liaison, NYU Langone Health. Created a business plan for an NYU-developed technology by researching the technology, identifying its competitive advantages, analyzing the market for the technology, and describing the business model for the company. *July - Nov 2017*
- *Graduate Teaching Assistant* to Dr. Angus Wilson in the seminar “Introduction to Research” at the Sackler Institute at NYU School of Medicine. *Fall 2017*
- *Peer tutor* for beginner and intermediate Macroeconomics and Econometrics at Williams College, MA. *2010-2012*

SKILLS

- Programming languages: Python, R, MATLAB, Shell scripting (Bash).
- Applications: Git, L<sup>A</sup>T<sub>E</sub>X, Jupyter notebook.
- Environments: High Performance Computing (SGE/Slurm), Unix/Linux, Windows.
- Assays: Transcriptomics (single-nucleus and bulk RNA-Seq), translomics (ribosome profiling and Trap-seq), Proteomics (MS/MS of purified synapses).
- Laboratory techniques : Primary neuron culture, transgene delivery with AAV and lentiviral vectors, in vivo pharmacology in mice, nucleic acid purification, high-throughput library preparations, qPCR, immuno-precipitation, western blotting, immuno-fluorescence, confocal microscopy, immunological assay development.