

Sameer Aryal

CONTACT INFORMATION

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RESEARCH INTERESTS

Genome-scale neurogenetics; high-throughput examination of the mechanisms of gene expression in neural systems.

EDUCATION

New York University, New York, NY

Doctor of Philosophy, Basic Medical Science, August 2013 - May 2020

- Dissertation: “Molecular and computational examination of *de novo* protein synthesis in fragile X syndrome”
- Advisor: Eric Klann, Ph.D.

Williams College, Williamstown, MA

Bachelor of Arts, Biology (honors) and Economics, September 2008 - June 2012

- Dissertation: “The role of DopR neuronal circuits in regulating endogenous arousal in *D. melanogaster*”
- Advisor: Tim Lebestky, Ph.D.

RESEARCH EXPERIENCE

Broad Institute of MIT and Harvard, Cambridge, MA

Postdoctoral Associate

Oct 2020 - present

Examining the molecular alterations in the synapses of multiple mouse models of schizophrenia and autism spectrum disorders using molecular and computational approaches.

New York University Center for Neural Science, New York, NY

Graduate Research Assistant

June 2014 - present

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 quantitatively determine the 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.

A*STAR-Duke-NUS Neuroscience Research Partnership, Singapore

Research Assistant

Aug 2012 - May 2013

Wrote MATLAB scripts to analyze *D. melanogaster* 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.

Williams College, Williamstown, MA

Honors Student

Sept 2011 - May 2012

Investigated which neuronal circuits regulate arousal, and how they are connected, in the *D. melanogaster* 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.**, Longo, F., Klann, E. Genetic removal of p70 S6K1 corrects coding sequence length-dependent alterations in mRNA translation in fragile X syndrome mice. *bioRxiv*. 2020.
2. 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. Genetic reduction of PERK-eIF2 α signaling in dopaminergic neurons drives cognitive and age-dependent motor dysfunction. *bioRxiv*. 2020.
3. Ho, J., Tumkaya, T., **Aryal, S.**, Choi, H., Claridge-Chang, A. Moving beyond P values: data analysis with estimation graphics. *Nature Methods*. 2019.
4. 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.
5. **Aryal, S.**, Klann, E. Turning up translation in fragile X syndrome. *Science*. 2018.
6. 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.

PAPERS IN PREPARATION

1. Longo F., **Aryal S.**, Anastasiades P., Baimel C., Maltese M., Albanese F., Zhu J., 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.

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), SQL.
- Applications: Git, L^AT_EX; common database, spreadsheet, and presentation software.
- Environments: High Performance Computing (SGE/Slurm), Unix/Linux, Windows.
- Laboratory techniques : primary neuron culture, transgene delivery with AAV and lentiviral vectors, in vivo pharmacology in mice, nucleic acid isolation, high-throughput library preparations, qPCR, immuno-precipitation, western blotting, immuno-fluorescence, confocal microscopy, immunological assay development.