Sameer Aryal

Contact Information

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Research Interests

Genome-scale neurogenetics; Applying genomic methods to elucidate mechanisms of neuropsychiatric disorders.

Education

New York University, New York, NY

Ph.D. Candidate, Basic Medical Science, August 2013 - May 2020 (expected)

- Dissertation: "Molecular and computational examination of S6K1-dependent *de novo* protein synthesis in fragile X syndrome"
- Advisor: Eric Klann, Ph.D.
- Cumulative GPA: 3.97/4.0

Williams College, Williamstown, MA

B.A., Biology (honors) and Economics, June 2012

- Dissertation: "The role of DopR neuronal circuits in regulating endogenous arousal in *D. melanogaster*"
- Advisor: Tim Lebestky, Ph.D.
- Cumulative GPA: 3.57/4.0; Biology: 3.63; Economics: 3.67

Research Experience

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, 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. Ho, J., Tumkaya, T., ***Aryal, S.***, Choi, H., Claridge-Chang, A. Moving beyond P values: data analysis with estimation graphics. *Nature Methods*. 2019.

2. 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.

3. ***Aryal, S.***, Klann, E. Turning up translation in fragile X syndrome. *Science*. 2018.

4. 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. ***Aryal, S.***, Longo, F., Klann, E. P70-S6 Kinase 1-dependent alterations in cortical messenger RNA translation in fragile X syndrome.

2. 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.

3. Longo F., Mancini M., Ibraheem P.L., ***Aryal S.***, Mesini C., Patel J., Penhos E., Rahman N., Donohue M., Santini E., Rice M.E., Klann E. Genetic reduction of PERK-eiF2a signaling in dopaminergic neurons drives cognitive and age-dependent motor dysfunction. Under review in *Nature Communications*.

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, LaTeX; common database, spreadsheet, and presentation software.
- Environments: High Performance Computing (SGE/Slurm), Unix/Linux, Windows.
- Molecular techniques : primary cell culture, transgene delivery with AAV and lentiviral vectors, nucleic acid isolation, high-throughput library preparations, qPCR, immuno-precipitation, western blotting, immuno-fluorescence, confocal microscopy, immunological assay development.