GABRIEL
YANCY

CONTACT INFO

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ABOUT ME

I earned my B.S from Fordham University in 2022 in Natural Sciences. Since then I have been working in the Behnia lab at Columbia University's Zuckerman Institute as a research technician studying the mechanisms of color learning and multi-sensory memory formation using the fruit fly as a model organism. This work involves the experimental side using fly husbandry techniques, genetic tools, dissection, and two-photon microscopy, as well as the theoretical side through the development of analysis pipelines and building of models for understanding population-level dynamics and encoding/decoding. While at Fordham I worked with Dr. Stephen Keeley to develop a model for performing dimensionality reduction of multi-region neural data to capture both shared and region-independent latent subspaces. This work was done in collaboration with experimentalists at other institutions who provided data which we used for analysis and led to a COSYNE poster presented in 2022.

My interests are in the computational modelling of neural circuits and behavior especially in relation to understanding the general structures of neural computations across species. I also have interests in the development of technology with the purpose of better understanding or taking advantage of the principles behind neural computation.

EDUCATION

BS in NATURAL SCIENCES   2018-2022
Fordham University | *New York, USA*

- Graduated with Honors
- Concentration in Cell and Molecular Biology
- Minor in Spanish
- Thesis topic: "Multi-region Poisson GPFA Isolates Independent and Shared Dynamics in High Dimensional Neural Recordings"

High School Diploma   2011-2018
Pittsburgh Creative and Performing Arts 6-12 | *Pittsburgh, USA*

- Major in Piano Performance
- Recognized as Best Piano Major of my Class, 2018

EXPERIENCE

RESEARCH STAFF ASSISTANT   2022-Present
Zuckerman Institute | *New York, USA*
(Working with Dr. Rudy Behnia)

- Working to identify the mechanisms behind color learning and multi-sensory memory formation in the fruit fly with an emphasis on sensory representations in the Kenyon cells of the mushroom body.
- Using two-photon microscopy for in-vivo imaging of the fruit fly brain while presenting visual and olfactory stimuli.
- Collaborating in the development of theoretical methods for understanding the neural circuitry.

RESEARCH ASSISTANT   2021-2022
Fordham University | *New York, USA*
(Working with Dr. Stephen Keeley)

- Assisted in developing dimensionality reduction techniques for high dimension multi-region neural data. Work consists of furthering modeling under the category of Gaussian Process Factor Analysis (GPFA) and linear dynamical systems (LDS) to improve low-dimensional representations of novel contemporary neural datasets (i.e., NeuroPixel recordings).
- Involved translating the program into the Jax coding language, advancing the cross-validation procedure, and investigation of the model optimization procedure.
- Used the model to conduct analysis on two externally developed datasets collected by labs at the University of Texas at Austin and the Princeton Neuroscience Institute.

RESEARCH ASSISTANT   2021
Fordham University | *New York, USA*
(Working with Dr. Ayala Fader)

- Assisted in the construction of a grant application for the proposed Demystifying Language Program (DLP). Compiled, read, and took notes on a variety of texts relating to the topics of critical pedagogy, language and social justice, and ethnographic writing.
- The resulting application was approved for funding and received $20,000 from The Wenner-Gren Foundation for development of the program.

PHARMACY TECHNICIAN   2021
CVS Pharmacy | *Bronx, USA*

- Completed technician responsibilities such as stocking, assembling, and distributing medications and helping both health care providers and patients in person and by phone by answering questions and requests.
- Work was done in a fully bilingual environment requiring equal use of English and Spanish for all duties.

FREELANCE MUSICIAN   2014-2018
Self-Employed | *Pittsburgh, USA*

- Provided musical background for live shows such as ballets, operas, musical theatre and cabarets. Coached soloists and ensembles for specific parts. Collaborated with performers to determine and achieve desired sound for production. Selected music carefully in order to achieve balance of musical styles for a wide variety of events.

ACHIEVEMENTS

Awards
- 2022 Graduated with Honors
- Accepted into Spanish language Study Abroad Program housed in Mendoza, Argentina
- Admitted to the dual-degree program at Harvard University and Berklee School of Music
- 2017 Attended the Pennsylvania Governor's School for the Sciences

Scholarships
- 2021 Natural Science Summer Research Award Grant at Fordham University
- 2018 National Merit Program Scholarship award

PUBLICATIONS

Articles

Chen, K., S. Doshi, K. Heckel, A. Li, E. Li, T. Li, A. Shanehsazzadeh, C. Woessner, **G. Yancy**, and A. Zhou (2017). "BarryBot: An Artificial Intelligence Designed to Play StarCraft". In: *Journal of the Pennsylvania Governor's School for the Sciences* 32, pp. 139–156.

Posters

G. Yancy, E. Hart, A. Bondy, CD. Brody, A. Huk, J. Pillow, and S. Keeley (2022). "Multi-region Poisson GPFA isolates shared and independent latent structure in sensorimotor tasks". COSYNE.

CONFERENCES

FORDHAM HONORS THESIS PRESENTATIONS   **2022**
Multi-region Poisson GPFA Isolates Independent and Shared Dynamics in High Dimensional Neural Recordings | *New York, USA*

- 15 minute presentation describing research conducted with Dr. Stephen Keeley for a mixed audience of both scientists and non-scientists
- Recording of presentation can be found at:

  https://fordham.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=70d5aa6f-b000-4010-a8f6-ae8c00fabc2f, **26:50-52:35**

COSYNE   **2022**
Multi-region Poisson GPFA isolates shared and independent latent structure in sensorimotor tasks | *Lisbon, Portugal*

- Attended as presenting and first author for poster summarizing research conducted with Dr. Stephen Keeley
- Poster highlighted the model's ability to extract distinct and significant information from latents associated with independent brain regions compared to latents associated with combined regions using two seperate datasets, one from macaque and one from rats.
- Project demonstrated additional usefulness in assessing the differences in ideal latent dimensionality between brain regions.
- Differences in the independence of brain regions was also of interest through the analysis of variance explained by the independent and shared latent subspaces.

MARY G. HAMILTON RESEARCH SYMPOSIUM   **2021**
Latent structure in multi-region neural spike train data using Gaussian Process factor analysis | *New York, USA*

- Presented a poster giving preliminary results on model construction and attempted fits using a single dataset taken from macaque as part of research conducted with Dr. Stephen Keeley

SKILLS

population-level data visualization and analysis, methods for dimensionality reduction, two-photon microscopy, fly husbandry, presentation design, Adobe suite, Autodesk Fusion

Coding Languages
- Python
- R
- SQL
- Swift. HTML
- CSS
- LaTeX

Languages
- English (native)
- Spanish (Fluency written and spoken)

REFERENCES

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Dr. Jason Morris
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