BRIAN M. SCHILDER

Sc.B., M.Phil.
Curriculum Vitae

Bioinformatician II
Ma'ayan Laboratory, Computational Systems Biology
Department of Pharmacological Sciences, Icahn School of Medicine at Mount Sinai
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ResearchGate: https://www.researchgate.net/profile/Brian_Schilder
GitHub: https://github.com/bschilder?tab=repositories

EDUCATION

The George Washington University (Washington, DC) 2017
- Master of Philosophy – Human Paleobiology, focus on *Evolutionary Neuroscience and Genomics*

Brown University (Providence, RI) 2011
- Bachelor of Science – Cognitive Neuroscience, focus on *Neurological Diseases and Disorders*

CORE QUALIFICATIONS

- **Programming**: Regularly develops automated high-performance computing pipelines to efficiently filter, analyze and visualize big data. *Scripting*: Python, R / Bioconductor; *Web Development*: HTML, CSS, Javascript / Three.js; *Database Creation/Management*: MongoDB, SQL.
- **Research**: 8+ years of highly multidisciplinary research experience including neuroscience, systems biology, bioinformatics, machine learning, genomics, transcriptomics, biomedicine, phylogenetics, biological anthropology, cognitive science and statistics.
- **Writing**: Strong writing skills as evidenced by obtainment of 5 research grants (~$70,000 since 2016), 5 peer-reviewed scientific publications and 14 international conference posters.
- **Management**: Capable of coordinating multiple independent projects at once (see experience as Lab Manager) with researchers of varying degrees of education and research experience.
- **Training**: Able to teach a variety of skills/topics (programming, bioinformatics, neuroscience, etc.) in both educational (5-time teaching assistant, mentor of undergraduate research projects) and practical environments (trained undergraduates, peers, colleagues and superiors in the respective methodologies of three different labs).
- **Communication**: Has developed effective communication skills with experts and non-experts through numerous conferences and departmental presentations, blog articles and 10 different public science outreach programs since 2009.

ADDITIONAL SKILLS

- Able to rapidly develop analysis pipelines and learn new software/programming languages
- Capable of handling many independent research projects simultaneously
- Proactive in developing intra- and international professional networks and initiating collaborations
- Exceptional managerial and organizational skills *(e.g. coordinating & training large groups of researchers)*

GRADUATE RESEARCH

The Evolution of the Hippocampus and Adult Neurogenesis: Novel Insights into the Origins of Human Memory
Summary: The hippocampus subserves long-term memory and spatial navigation in many species, but only in humans does it additionally mediate episodic memory and imagination. By investigating the evolution of the hippocampus and adult hippocampal neurogenesis across primates at the levels of neuroanatomy, whole-transcriptome gene expression, and genotype, I sought to elucidate the neurobiological basis underlying human-specific cognitive abilities as well as our unique vulnerability to hippocampus-degrading neurological diseases.

PUBLICATIONS

1. DJB Clarke, MV Kuleshov, **BM Schilder**, D Torre, ME Duffy, AB Keenan, A Lachmann, AS Feldmann, GW Gundersen, MC Silverstein, Z Wang (2018) eXpression2Kinases (X2K) Web: linking expression signatures to upstream cell signaling networks. *Nucleic Acids Research*, 46 (W1), pW171-W179 https://doi.org/10.1093/nar/gky458
2. F Subiaul, L Zimmerman, E Renner, **BM Schilder**, R Barr (2015) Defining elemental imitation mechanisms: A comparison of cognitive and motor-spatial imitation learning across object- and computer-based tasks. *Journal of Cognition and Development*, 17 (2), p221-243, https://doi.org/10.1080/15248372.2015.1053483
3. KA Phillips, MK Hambright, K Hewes, **BM Schilder**, CN Ross, SD Tardif (2015) Take the monkey and run. *Journal of Neuroscience Methods*, *248*, p27–31. http://doi.org/10.1016/j.jneumeth.2015.03.023
4. F Subiaul, EM Patterson, **BM Schilder**, E Renner, R Barr (2014) Becoming a high-fidelity - super - imitator: what are the contributions of social and individual learning? *Developmental Science*, 18 (6), p1025-1035, http://doi.org/10.1111/desc.12276
5. F Subiaul, **BM Schilder** (2014) Working memory constraints on imitation and emulation. *Journal of Experimental Child Psychology*, 128, p190-200, http://doi.org/10.1016/j.jecp.2014.07.005

PRESENTATIONS

- **Podium Talks**:
  - JB Johnston Club for Evolutionary Neuroscience (2014, 2016)
- **Poster Talks**:
  - Illuminating the Druggable Genome (2018)
  - Big Data 2 Knowledge - Library of Integrated Network-Based Cellular Signatures (2018)
  - Society for Neuroscience (2013, 2015, 2016, 2017)
  - Association for American Physical Anthropologists (2013, 2015)
  - Community Research Education and Engagement for Data Science (2016)
- **Departmental Talks**:
  - Mount Sinai Department of Pharmacological Sciences, Works in Progress (2018)
  - The George Washington U Research Days (2013)
  - The George Washington U, Department of Human Paleobiology, Journal Club & Lab Meeting Presentations (2011-2017)

CO-AUTHORED CONFERENCE POSTERS

1. **BM Schilder**, A Lachmann, M Kuleshov, A Ma'ayan (2018) Learning X2K: Parameter Optimization via Genetic Algorithms to Calibrate the Expression2Kinases Pipeline. *Illuminating the Druggable Genome*.
2. **BM Schilder**, A Lachmann, M Kuleshov, A Ma'ayan (2018) Learning X2K: Parameter Optimization via Genetic Algorithms to Calibrate the Expression2Kinases Pipeline. *Big Data 2 Knowledge - Library of Integrated Network-Based Cellular Signatures*.
3. **BM Schilder**, BJ Bradley, CC Sherwood (2017) The evolution of the human hippocampus and neuroplasticity. *Association for American Physical Anthropologists*.
4. **BM Schilder**, BJ Bradley, CC Sherwood (2016) The molecular evolution of the primate hippocampus. *Society for Neuroscience*.
5. KA Phillips, MK Hambright, K Hewes, **BM Schilder**, B Jagessar, B t'Hart, SD Tardif (2015) Effects of exercise on disease progression and cognition in the marmoset EAE model. *JB Johnston Club for Evolutionary Neuroscience*.
6. **BM Schilder**, WA Barr, R Bobe, CC Sherwood (2015) The Effects of Climatic Trends, Variability, and Rates of Change On Mammalian Brain Evolution. *Association for American Physical Anthropologists*.
7. E Renner, **BM Schilder**, F Subiaul (2015) Individual, Observational, and Imitation Learning in Orangutans and Children. *Association for American Physical Anthropologists*.
8. A Gokhale, **BM Schilder**, F Subiaul (2014) The helper hinderer task revisited: an infant eye tracking study. *The George Washington University Research Day*.
9. **BM Schilder**, O Adeyo (2013) Dendritic morphology of pyramidal neurons across the visual stream: A direct comparison of chimpanzees and humans. *Society for Neuroscience*.
10. S Bianchi, T Duka, G Muntane, **BM Schilder**, CD Stimpson, WD Hopkins (2013) The striatum in the evolution of learned vocalizations: Understanding the neurobiological precursors to human speech using a chimpanzee model. *Society for Neuroscience*.

11. L Zimmerman, N Brito, C Mendelson, R Barr, E Renner, **BM Schilder**, F Subiaul (2013) Imitation & emulation in a novel box task. *Association for Psychological Science*.
12. R Barr, F Subiaul, L Zimmerman, L Renner, **BM Schilder**, C Mendelson, L Golojuch (2013) A study of imitation and working memory in 2- to 4- year-olds. *Association for Psychological Science*.
13. J Miller, **BM Schilder**, L Peizer, F Subiaul (2013) The impact of wealth on sharing preferences in children. *Child Development Society*.

PUBLICATION ACKNOWLEDGEMENTS

1. M van Vugt, P Simen, J Cohen (2011) Trial-by-trial adaptation of decision making performance: a model-based EEG analysis. *Interdisciplinary Perspectives on Cognition, Education, and the Brain, Hanse Studies*, Vol. 7. Oldenburg: BIS-Verlag.
2. M van Vugt, P Simen, L Nystrom, P Holmes, J Cohen (2012) EEG oscillations reveal neural correlates of evidence accumulation. *Frontiers in Neuroscience*, 6(106), 1-13.

MANUSCRIPTS IN PREPARATION

1. N Skene, **BM Schilder**, JH Leffler. Deconvolution of neural cell sub-types through whole-genome detection of positive selection in primate evolution.
2. **BM Schilder**, A Louran, J Lier, M Cosacak, S Neuner. Identification of Alzheimer's disease and MCI subtypes using transcriptomic signatures.
3. **BM Schilder**, H Petry, P Hof. The ecological and genetic correlates of primate hippocampal subfield evolution.
4. **BM Schilder**, P Hof, H Petry. Phylogenetic and ecological drivers underlie the evolutionary reorganization of the primate hippocampus.

RESEARCH EXPERIENCE

Ma'ayan Laboratory – Computational Systems Biology (Bioinformatician II) 10/2017 – Present
Icahn School of Medicine at Mount Sinai, New York, NY

- Processes and analyzes large-scale genomic and biomedical data using a variety of programming languages.
- Develops machine learning algorithms optimize bioinformatics pipelines and make biological insights.
- Develops, deploys and maintains computational tools, software, databases and web applications for basic and clinical research.

Systems Genetics in Neurodegeneration (Participant) 08/2017 – 09/2017
Technische Universität Dresden / eMed, Frauenchiemsee, Germany

- Attended lectures and extended skills in extraction and analysis of big data from biomedical and neurogenomic resources.
- Developed, performed and wrote manuscript for collaborative bioinformatics research project in less than one week.

Community Research Education and Engagement for Data Science (Participant) 06/2016
Icahn School for Medicine at Mount Sinai, New York, NY

- Intensive summer school in high-performance computing, coding, genome database utilization and bioinformatics methods including transcriptomics and genetic association testing.

Evolution of the Hippocampus and Adult Neurogenesis Research (Graduate Student) 08/2013 – 08/2017
The George Washington University, Washington, DC

- Researched the evolution of human-specific cognitive abilities and neurological disease susceptibilities (e.g. Alzheimer's).
- Focused on neuroanatomical, transcriptomic and genomic evolution of the human hippocampus and memory.

Laboratory for Evolutionary Neuroanatomy (Research Assistant) 10/2011 – 08/2013
The George Washington University, Washington, DC

- Performed histology, microscopy and quantitative stereologic neuroanatomy; trained personnel on lab protocols.

Social Cognition Laboratory (Senior Lab Manager) 08/2011 – 08/2013
The George Washington University, Washington, DC

- Organized and trained dozens of undergraduates to conduct weekly cognitive development research; designed and/or directly contributed to over 15 research projects in two years.

The Effects of Exercise on Marmoset Models of Multiple Sclerosis 08/2014 – 08/2017
Southwestern National Primate Research Center, San Antonio, TX

- Collaboration with Dr. Kimberley Phillips (Trinity University, Dept. Neuroscience) investigating of the neurobiological mechanisms underlying the ameliorating effects of exercise on relapse-remitting Multiple Sclerosis.

Koobi Fora Field School 06/2014 – 08/2014
Ileret, Kenya
- Served as Teaching Assistant the directorship of Dr. David Braun excavating Lower Paleolithic hominin sites (*Homo*, *Paranthropus*), and as Project Leader investigating the running biomechanics of local Daasanach tribespeople while mentoring undergraduate students.

Field-school in Paleoanthropology and Paleolithic Archaeology 06/2012 – 07/2012
Mala Balanica, Velika Balanica, & Pešturina sites, Sićevo, Serbia
- Under the directorship of Drs. Mirjana Roksandic (U. Winnipeg) and Dušan Mihailovic (U. Belgrade) volunteered with an international team to excavate Paleolithic fossils and tools (*H. heidelbergensis, H. neanderthalensis*). Attended lectures.

Field School for Quaternary Paleoanthropology and Prehistory 07/2011
Universidad de Murcia, Murcia, Spain
- Under the directorship of Dr. Michael Walker (U. Murcia) volunteered with an international team to excavate Paleolithic fossils and tools from Cueva Negra (*H. heidelbergensis*) and Sima de las Palomas (*H. neanderthalensis*).

American Museum of Natural History 06/2011 – 08/2011
New York, NY
- As Research Intern contributed to paleoanthropological research on primate fossils using 3D morphometry imaging equipment including Minolta, Microscribe and CT.

Princeton Neuroscience Institute Internship 06/2010 – 08/2010
Princeton University, Princeton, NJ
- As Research Intern investigated the neural basis of decision-making in humans in the lab of Dr. Jonathan Cohen and under the direct mentorship of Dr. Marieke van Vugt. Recruited participants, recorded EEG and analyzed data in MATLAB.

Undergraduate Course Research 09/2009 – 05/2010
Dept. of Psychology, Brown University, Providence, RI
- *Experimental Analysis of Animal Behavior & Cognition:* Conducted various operant conditioning experiments on rats. Gained experience in animal behavioral training, data collection, and data analysis in MATLAB.
- *Laboratory in Genes and Behavior:* Tested transgenic mice with modified N-type voltage-gated calcium channel subunits in a battery of cognitive and sensorimotor tasks. Results were published by Prof. Burwell in peer-reviewed journal.

ADDITIONAL ACADEMIC ENRICHMENT

- **Audited**: Anthropological Genetics, Next Generation Sequencing Technologies
- **Online Training**: Coursera (*Network Analysis in Systems Biology with Avi Ma'ayan, Machine Learning with Andrew Ng*), Codecademy *(Python, Command Line, SQL, Javascript, Java)*, Udemy *(Logic Pro X)*, Network Analysis Workshop *(WGCNA)*
- **American Association of Physical Anthropologists Meeting**: 2013, 2015, 2016, 2017
- **Society for Neuroscience Meeting**: 2011, 2013, 2014, 2015, 2016, 2017
- **GWU Neuroscience Symposium**: 2012, 2013, 2014, 2015, 2016, 2017
- **Academic Podcasts**: This Week in Machine Learning & Artificial Intelligence, The AI Podcast by NVIDIA, Machine Learning Guide by OCDevel, Brain Science with Ginger Campbell MD

TEACHING EXPERIENCE

2018 **Research Co-Mentor** *(The Icahn School of Medicine at Mount Sinai)*
- Co-mentored summer intern in the 'Summer Research Training Program in Biomedical Big Data Science' for her research project 'ChEA3: Transcription Factor Enrichment Analysis Portal'.

2018 **Guest Lecturer** *(The Icahn School of Medicine at Mount Sinai)*
- Lectured on data visualization in Python and Jupyter notebooks in the PhD/MD course 'Programming for Big Data Biomedicine'.

2016-2017 **Research Mentor** *(The George Washington University, DC)*
- Mentored undergraduate student on project quantifying differences in adult hippocampal neurogenesis between marmoset models of multiple sclerosis and controls.

2015 **Teaching Assistant: Human Brain Evolution** *(The George Washington University, DC)*
- Guest lectured, graded all assignments and exams, and provided additional educational support during office hours.

2014 **Teaching Assistant: Biological Psychology** *(The George Washington University, DC)*
- Led undergraduates in article discussions, graded all assignments and exams, and provided additional educational support during office hours.

2013-2014 **Teaching Assistant: Biological Anthropology** *(The George Washington University, DC)*
- Led undergraduate students in two, 2-hour lab sessions per week, graded lab assignments and exams, and provided additional educational support during office hours.

2013 **Research Mentor** *(The George Washington University, DC)*
- Mentored undergraduate student in Psychology Department for her senior research thesis on infant cognitive development using eye tracking paradigm.

2011-2013 **Protocol Training** *(The George Washington University, DC)*
- Trained undergraduate, graduate, and post-doctoral researchers in Social Cognition Lab and Lab for Evolutionary Neuroscience in a variety of methodological research protocols.

PUBLIC OUTREACH

2016 **Public Understanding of Science Internship** *(National Museum of Natural History, DC)*
- Developed a mobile cart activity designed to engage, educate, and excite NMNH visitors of all ages and ability levels about the genetics underlying human brain evolution. Principles conveyed through the cart include: human relatedness to non-human primates, brain expansion over hominin evolution, DNA as a molecular mechanism of evolution.

2016 **The Scientist Is In** *(National Museum of Natural History, Washington, DC)*
- Engaged the public in educational demos of human brain evolution and fielded questions from visitors.

2015 **Brain Awareness Week** *(Margruder High School, Rockville, MD)*
- Participated in Brain Awareness Day event by groups of engaging high school students in an interactive demo that introduced how one studies evolutionary neuroscience and why its such a fascinating topic that has much to teach us about ourselves.

2014, 2015 **Share Fair STEMosphere** *(The George Washington University)*
- Hosted an exhibition on brain evolution at an expo to spark students' interest in science, as well as speak to DC-area educators about how to incorporate topics of human evolution and neuroscience into the curriculum.

2014 **High School Science Career Talk** *(Delaware Valley Regional High School, Frenchtown, NJ)*
- Returned to alma mater to deliver a full school day of interactive presentations to classes of high school students about research in neuroscience, human origins, and science in general. Explicitly linked students' curriculum content to tangible career paths to promote interest in pursuing scientific research.

2014 **Evolution in Education** *(St. Columba's Episcopal Church, Washington, DC)*
- Conducted a five-part series of educational days oriented towards teaching preschoolers about a wide variety of topics in human evolution including Primatology, Taphonomy, Ecology, Neuroscience, and Hominin Behavior.

2014-16 **Center for Advanced Human Paleobiology Blog** *(The George Washington University, DC)*
- 'The Unexpected Benefits of Exercise: Past, Present & Future'
- 'Does Evolution Have a Place in Medicine?'
- 'Why Was a Neuroscientist in the African Savannah for 2 months?'

2013 **Super Neuroscience Saturday** *(National Museum of Natural History, Washington, DC)*
- Co-hosted by the White House's Office of Science & Technology Policy and the Smithsonian's National Museum of Natural History. This included the grand opening of the NMNH Q?rius exhibit where researchers from various subdisciplines of neuroscience hosted educational stations. Members of the Laboratory for Evolutionary Neuroscience, including myself, hosted a station educating local DC middle school students about research in brain evolution.

2013 **Neuroscience Experience** *(Blow Pearce Junior Academy, Southeast Washington, DC)*
- Developed and conducted educational unit on human evolution and neuroscience for elementary students with other researchers from Sherwood Laboratory for Evolutionary Neuroscience.

2013 **Brain Scientist Visit** *(Shepherd Elementary School, Silver Spring, MD)*

- Personally designed and delivered an interactive presentation to a 2nd grade classroom on brains and evolution. Focused on teaching children what the brain does, how it differs between animals, how human brains evolved, and generating interest in learning about science in general.

2009 **Brain Awareness Week** *(Seakonk, MA)*

- Under direction of Dr. John Stein (Brown University), taught module on neuroscience of language to local Massachusetts high school students.

EXTRACURRICULAR

Competitive Running Career

- Committed to over eight continuous years of varsity Cross Country, Winter Track, and Spring Track throughout high school and college. Year-round, daily training and traveling to weekly competitions necessitated a dedicated and regimented lifestyle in order to succeed as a student-athlete. My passion and work ethic have carried over to career as a researcher.

Music Production

- Ongoing hobby in writing, recording, producing and performing original music.
- Creating music in collaboration with generative music AI algorithms.