

# Stanford

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## Neal Amin

Clinical Assistant Professor, Psychiatry and Behavioral Sciences

### Bio

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#### BIO

Neal D. Amin, MD, PhD is a practicing Stanford psychiatrist and neurobiologist who studies human cellular neurodevelopment - the process by which genetic and molecular pathways give rise to immense cellular diversity in the human brain during embryonic development. A more complete understanding of human cellular neurodevelopment will lead to the next generation of targeted therapeutics for wide ranging neuropsychiatric conditions.

Dr. Amin completed his graduate work with Professor Samuel Pfaff (Salk Institute) where he investigated the regulatory dynamics of a miRNA associated with neurodegeneration using mouse genetic models, single cell RNA sequencing, in vivo CRISPR/Cas9, and linear and non-linear models of the impact of gene dose variation on neurodevelopment and mammalian survival (see: Amin, N.D., et al., *Science*, 2015; Amin, N.D.\*, et al., *Neuron* 2021, Amin, N.D.\*, et al. *STAR Protocols*; \*co-corresponding author). At Stanford, Dr. Amin worked with Stanford Professor Sergiu Pasca, MD to use stem-cell derived human brain organoids as model of neurodevelopment and pathophysiology of psychiatric disorders such as 22q11 deletion syndrome and motor neuron diseases. Human brain organoids are three dimensional cellular models of the human nervous system that recapitulate complex macrostructural and cellular features of the human brain. He published a highly cited review on the utility of human brain organoid technology for studying psychiatric disorders (Amin, N.D., and Pasca, S.P. *Neuron*, 2018). Dr. Amin is principal investigator on awards from the NIH/NINDS (K08 Career Development Award) and the Brain and Behavior Research Foundation (NARSAD Young Investigator Award). He has particular interest in leveraging cutting-edge biological technologies and bioinformatics to advance the investigation of neurological and psychiatric disorders.

Dr. Amin completed the Stanford Psychiatry Research Track Residency Program and completed the Palo Alto Psychoanalytic Psychotherapy Training Program Fellowship Year. He was recognized with the Outstanding Resident Award from the NIMH/NIH for his academic contributions. He recognizes the critical importance of advancing human neuroscience for the countless patients and families suffering from neuropsychiatric disorders that lack effective treatments. He is a practicing therapist and psychiatrist in Stanford's Evaluation Clinic.

#### ACADEMIC APPOINTMENTS

- Clinical Assistant Professor, Psychiatry and Behavioral Sciences
- Member, Wu Tsai Neurosciences Institute

#### PROFESSIONAL EDUCATION

- Board Certification, American Board of Psychiatry and Neurology , Psychiatry
- Residency, Stanford University , Psychiatry
- PhD, UC San Diego , Biomedical Sciences

- MD, UC San Diego
- BA, Columbia University, Columbia College

## Publications

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### PUBLICATIONS

- **Motor neurons use push-pull signals to direct vascular remodeling critical for their connectivity** *NEURON*  
Martins, L. F., Brambilla, I., Motta, A., de Pretis, S., Bhat, G., Badaloni, A., Malpighi, C., Amin, N. D., Imai, F., Almeida, R. D., Yoshida, Y., Pfaff, S. L., Bonanomi, et al  
2022; 110 (24): 4090-+
- **Mouse embryo models built from stem cells take shape in a dish.** *Nature*  
Amin, N. D., Pasca, S. P.  
2022; 610 (7930): 39-40
- **Maturation and circuit integration of transplanted human cortical organoids.** *Nature*  
Revah, O., Gore, F., Kelley, K. W., Andersen, J., Sakai, N., Chen, X., Li, M. Y., Birey, F., Yang, X., Saw, N. L., Baker, S. W., Amin, N. D., Kulkarni, et al  
2022; 610 (7931): 319-326
- **Detecting microRNA-mediated gene regulatory effects in murine neuronal subpopulations.** *STAR protocols*  
Amin, N. D., Senturk, G., Hayashi, M., Driscoll, S. P., Pfaff, S. L.  
2022; 3 (1): 101130
- **A hidden threshold in motor neuron gene networks revealed by modulation of miR-218 dose.** *Neuron*  
Amin, N. D., Senturk, G., Costaguta, G., Driscoll, S., O'Leary, B., Bonanomi, D., Pfaff, S. L.  
2021
- **Conserved genetic signatures parcellate cardinal spinal neuron classes into local and projection subsets.** *Science (New York, N.Y.)*  
Osseward, P. J., Amin, N. D., Moore, J. D., Temple, B. A., Barriga, B. K., Bachmann, L. C., Beltran, F., Gullo, M., Clark, R. C., Driscoll, S. P., Pfaff, S. L., Hayashi, M.  
2021; 372 (6540): 385-393
- **Neuronal defects in a human cellular model of 22q11.2 deletion syndrome.** *Nature medicine*  
Khan, T. A., Revah, O. n., Gordon, A. n., Yoon, S. J., Krawisz, A. K., Goold, C. n., Sun, Y. n., Kim, C. H., Tian, Y. n., Li, M. Y., Schaepe, J. M., Ikeda, K. n., Amin, et al  
2020
- **Generation of Functional Human 3D Cortico-Motor Assembloids.** *Cell*  
Andersen, J. n., Revah, O. n., Miura, Y. n., Thom, N. n., Amin, N. D., Kelley, K. W., Singh, M. n., Chen, X. n., Thete, M. V., Walczak, E. M., Vogel, H. n., Fan, H. C., Pasca, et al  
2020
- **Building Models of Brain Disorders with Three-Dimensional Organoids** *NEURON*  
Amin, N. D., Pasca, S. P.  
2018; 100 (2): 389-405
- **Speed and segmentation control mechanisms characterized in rhythmically-active circuits created from spinal neurons produced from genetically-tagged embryonic stem cells** *ELIFE*  
Sternfeld, M. J., Hinckley, C. A., Moore, N. J., Pankratz, M. T., Hilde, K. L., Driscoll, S. P., Hayashi, M., Amin, N. D., Bonanomi, D., Gifford, W. D., Sharma, K., Goulding, M., Pfaff, et al  
2017; 6
- **Loss of motoneuron-specific microRNA-218 causes systemic neuromuscular failure** *SCIENCE*  
Amin, N. D., Bai, G., Klug, J. R., Bonanomi, D., Pankratz, M. T., Gifford, W. D., Hinckley, C. A., Sternfeld, M. J., Driscoll, S. P., Dominguez, B., Lee, K., Jin, X., Pfaff, et al  
2015; 350 (6267): 1525-1529
- **Chemical scaffolds with structural similarities to siderophores of nonribosomal peptide-polyketide origin as novel antimicrobials against Mycobacterium tuberculosis and Yersinia pestis** *BIOORGANIC & MEDICINAL CHEMISTRY LETTERS*

Ferreras, J. A., Gupta, A., Amin, N. D., Basu, A., Sinha, B. N., Worgall, S., Jayaprakash, V., Quadri, L. N.  
2011; 21 (21): 6533–37