

THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

2007- 2013	Postdoctoral fellow	Adult neurogenesis	Johns Hopkins University
2007	PhD	Neuroscience	University of California, Berkeley

PROFESSIONAL EXPERIENCE

2021- Member, Duke-UNC Alzheimer's Disease Research Center (ADRC)
2019- Associate Professor (with tenure), Department of Pharmacology, UNC-Chapel Hill
2018- Associate Director, Neuroscience Curriculum, UNC-Chapel Hill
2018- Member, Intellectual and Developmental Disabilities Research Center, Chapel Hill
2013- Member, Neuroscience Center, UNC-Chapel Hill
2013-2019 Assistant professor, Department of Pharmacology, UNC-Chapel Hill

HONORS AND AWARDS

Academic Award

2019- Jeffrey Houtp Distinguished Investigator (UNC-Endowed title)
2018 Philip and Ruth Hettleman Prize
2018 Distinguished Lectureship (University of Toronto)
2014-2018 American Heart Association Scientist Development Award
2014-2017 Whitehall Foundation Award
2014-2016 NARSAD Young Investigator Award (Brain and Behavioral Research Foundation)
2016 American College of Neuropsychopharmacology (ACNP) Travel Award
2015 Junior Faculty Career Development Award (UNC)
2014 Janett Rosenberg Trubatch Career Development Award (Society for Neuroscience)
2013 Alfred Blalock Young Investigator Award (Johns Hopkins University)
2011-2013 Maryland Stem Cell Research Foundation Postdoctoral Fellowship
2012 Julius Axelrod Postdoctoral Travel Award (Society for Neuroscience)
2011 Keystone Symposia Scholarship (Adult Neurogenesis)
2008-2011 Life Sciences Research Foundation Postdoctoral Fellowship

Mentor Award

- 2019 Outstanding Postdoctoral Mentor Award (UNC)
2019 Mentor of the Year (UNC Neuroscience Curriculum)

BIBLIOGRAPHY

***: corresponding author, #: equal contribution**

Book chapters

1. **Song J***, Olsen RHJ, Sun J, Ming GL, and Song H (2016). Neuronal circuitry mechanisms regulating adult neurogenesis. **Neurogenesis**, Cold Spring Harbor Press, edited by Fred Gage, Gerd Kempermann, and Hongjun Song. Aug 1;8(8):a018937 doi:10.1101/cshperspect.a018937
2. **Song J** and Tanouye M (2009). The genetics and molecular biology of seizure-susceptibility in *Drosophila*. In: S Baraban (ed.) **Animal Models of Epilepsy: Methods and Innovations**. Humana Press, Totowa, NJ. Pages 27-43

Refereed publications

3. Wander C[#], Li YD[#], Bao H, Asrican B, Luo YJ, Sullivan H, Chen Z, Zhang L, Wickersham I, Shih YY, Cohen T, **Song J*** (2023). Compensatory remodeling of a septo-hippocampal GABAergic network in a triple transgenic Alzheimer's mouse model. **Journal of Translational Medicine** 15;21(1):258.
4. Li YD[#], Luo YJ[#], Xie L, Tart DS, Sheehy RN, Zhang L, Chen X, **Song J*** (2023). Activation of hypothalamic-enhanced adult-born neurons restores cognitive and affective function in Alzheimer's disease. **Cell Stem Cell** 30 (4), 415-432.
5. Wolter JM, Le BD, Matoba N, Lafferty MJ, Aygün N, Liang D, Courtney K, **Song J**, Piven J, Zylka MJ, Stein JL (2023) Cellular genome-wide association study identifies common genetic variation influencing lithium induced neural progenitor proliferation. **Biological Psychiatry** 93(1):8-17
6. Li YD[#], Luo YJ[#], Chen ZK, Quintanilla L, Cherasse Y, Zhang L, Lazarus M, Huang ZL, **Song J*** (2022). Hypothalamic modulation of adult hippocampal neurogenesis in mice confers activity-dependent regulation of memory and anxiety-like behavior. **Nature Neuroscience** 25(5):630-645 (Featured in Nature Review Neuroscience)
7. Asrican B and **Song J*** (2021). Recording membrane potential in adult neural stem cells as readout for stem cell activation following neural circuit stimulation in mouse hippocampal slices. **STAR Protocols** Feb 8;2(1):100335. doi: 10.1016/j.xpro.2021.100335.
8. Asrican B and **Song J*** (2021). Extracting meaningful circuit-based calcium dynamics in astrocytes and neurons from adult mouse brain slices using single-photon GCaMP imaging. **STAR Protocols** Feb 1;2(1):100306. doi: 10.1016/j.xpro.2021.100306.
9. Asrican B[#], Wooten J[#], Li Y, Quintanilla L, Zhang F, Bao H, Yeh CY, Wander C, Luo YJ, Olsen RHJ, Lim SA, Jin P, **Song J*** (2020). Neuropeptides modulate local astrocytes to regulate adult hippocampal neural stem cells. **Neuron** 108(2):349-366 (Selected for issue Preview)
10. Li Y, Bao H, Luo Y, Yoan C, Sullivan HA, Quintanilla L, Wickersham IR, Lazarus M, Shin YY, **Song J*** (2020). Supramammillary nucleus synchronizes with dentate gyrus to regulate spatial memory retrieval through glutamate release. **eLife** doi: 10.7554/eLife.53129.
11. Wander CM, Tsend JH, Song S, Housseiny H, Tart S, Ajit A, Shin YY, Lobrovich R, **Song J**, Meeker R, Irwin D, Cohen T (2020). The accumulation of tau-immunoreactive hippocampal granules and corpora amylacea implicates reactive glia in tau pathogenesis during aging. **iScience** <https://doi.org/10.1016/j.isci.2020.101255>

12. Kang E[#], **Song J[#] (co-first author)**, Lin Y, Park J, Lee JH, Hussani Q, Gu Y, Ge S, Li W, Berninger B, Hsu K, Christina K, Song H, Ming GL (2019). Interplay between a mental disorder risk gene and developmental polarity switch of GABA action leads to excitation-inhibition imbalance. **Cell Reports** 28(6):1419-1428
13. Quintanilla L, Yeh CY, Bao H, Catavero C, **Song J^{*}** (2019). Assaying circuit specific regulation of adult hippocampal neural precursor cells. **JoVE** Jul 24;(149):10.3791/59237
14. Yeh CY[#], Asrican B[#], Moss J, Quintanilla L, He T, Mao X, Cassé F, Gebara E, Bao H, Lu W, Toni N, **Song J^{*}** (2018). Mossy cells control adult neural stem cell quiescence and maintenance through a dynamic balance between direct and indirect pathways. **Neuron** 99(3):493-510 (Featured article with a preview)
15. Crowther A[#], Lim SA[#], Asrican B, Albright B, Wooten J, Yeh CY, Bao H, Cerri DH, Hu J, YY Ian Shin, Asokan A, **Song J^{*}** (2018). An adeno-associated virus-based toolkit for preferential targeting and manipulating quiescent neural stem cells in the adult hippocampus. **Stem Cell Reports** 10(3):1146-1159 (Cover Article)
16. Chen X, Wang S, Zhou Y, Han Y, Li S, Xu Q, Xu L, Zhu Z, Deng L,Y, Yu L, Song L, Chen P, **Song J**, Takahashi E, He G, He L, Li W, Chen CD (2018). PHF8 histone demethylase deficiency causes cognitive impairments through the mTOR pathway. **Nature Communication** 9(1):114
17. Bao H[#], Asrican B[#], Li W[#], Gu B, Wen ZX, Lim ZA, Haniff I, Ramakrishnan C, Deisseroth K, Philpot B, **Song J^{*}** (2017). Long-range GABAergic inputs regulate neural stem cell quiescence and control adult hippocampal neurogenesis. **Cell Stem Cell** 21(5):604-617 (Cover article; Featured article with a preview; Recommended by F1000; Selected as one of 10 Best Articles in 2017 in Cell Stem Cell)
18. Liu K, Kim J, Zhang YS, Bao H, Denaxa M, Lim SA, Kim E, Liu C, Wickwesham IR, Pachinis V, Hatter S, **Song J**, Brown SP, Blackshaw S (2017). Lhx6-positive GABA-releasing neurons of the zona incerta promote sleep. **Nature** 548(7669): 582-587
19. Winkle C, Olsen RHJ, Kim H, Moy S, **Song J^{*}**, Gupton S^{*} (2016). TRIM9 deletion alters developing and adult born hippocampal neuron morphogenesis and impairs spatial learning and memory. **J. Neuroscience** 4;36(18):4940-58 (Cover Article)
20. Murlidharan G, Crowther A, Reardon RA, **Song J**, Asokan A (2016). Glymphatic fluid transport controls paravascular clearance of AAV vectors from the brain. **JCI insights** 1(14):e88034
21. Shin J, Berg DA, Zhu Y, Shin JY, **Song J**, Bonaguidi MA, Enikolopov G, Nauen DW, Christian KM, Ming GL, and Song H (2015). Single-cell RNA-seq with Waterfall reveals molecular cascades underlying adult neurogenesis. **Cell Stem Cell** 17(3):360-72
22. Vardy E, Robinson JE, Li C, Olsen, R.H.J., DiBerto, J.F., Sassano F.M., Huang X.P., Zhu, H., Urban DJ, Rittiner JE, Crowley NA, **Song J**, Kash T.L., Malanga C.J., Krashes M., Roth B.L. (2015). A DREADD for multiplexing chemogenetic interrogation of neural circuits. **Neuron** 20;86(4):936-46.
23. Duan Y, Wang SH, **Song J**, Mironova Y, Ming GL, Kolodkin A, and Giger RJ (2014). Semaphorin 5A inhibits synaptogenesis in early postnatal- and adult-born hippocampal dentate granule cells. **eLife** Oct 14;3 doi: 10.7554/eLife.04390
24. Jang M, Kitabatake Y, Bonaguidi, MA, Sun J, **Song J**, Kang E, Jun H, Zhong C, Su Y, Guo J, Wang M, Sailor K, Kim JY, Gao Y, Christian KM, Ming GL, Song H (2013). Secreted frizzled-related protein 3 regulates activity-dependent adult hippocampal neurogenesis. **Cell Stem Cell** 12(2):215-23
25. Zhou M, Li W, Huang S, **Song J**, Kim JY, Tian X, Kang E, Liu C, Balaji J, Zhou Y, Parivash SN, Zhou Y, Ehninger D, He L, Song H, Ming GL, Silva AJ (2013) mTOR inhibition ameliorates cognitive and affective deficits caused by Disc1 knockdown specifically in adult-born dentate

granule neurons. **Neuron** 77(4):647-54

26. **Song J**, Sun J, Moss J, Wen Z, Sun G, Hsu D, Zhong C, Davoudi H, Christian K, Toni N, Ming GL, Song H (2013). Parvalbumin interneurons mediate neuronal circuitry-neurogenesis coupling in the adult hippocampus. **Nature Neuroscience** 16(12):1728-30
27. **Song J**, Zhong C, Bonaguidi MA, Sun G, Hsu D, Gu Y, Meletis K, Huang J, Ge S, Enikolopov G, Deisseroth K, Luscher B, Christian K, Ming GL, Song H (2012). Neuronal circuitry mechanism regulating adult quiescent neural stem-cell fate decision. **Nature** 489: 150-154 (Commented in Cell Stem Cell, Nat Rev Neurosci, BioEssays, Recommended by F1000)
28. Lee DA, Bedont JL, Pak T, Wang H, **Song J**, Miranda-Angulo A, Takiar V, Charubhumi V, Balordi F, Takebayashi H, Aja S, Ford E, Fishell G, Blackshaw S (2012). Tanycytes of the hypothalamic median eminence form a diet-responsive neurogenic niche. **Nature Neuroscience** 15(5):700-2
29. Kim JY, Liu CY, Zhang F, Duan X, Wen Z, **Song J**, Feighery E, Lu B, Rujescu D, St Clair D, Christian K, Callicott JH, Weinberger DR, Song H, Ming GL (2012). Interplay between DISC1 and GABA signaling regulates neurogenesis in mice and risk for schizophrenia. **Cell** 148(5):1051-64
30. **Song J***, Parker L, Hormozi L and Tanouye M (2008). DNA topoisomerase I inhibitors ameliorate seizure-like behaviors and paralysis in a *Drosophila* model of epilepsy. **Neuroscience** 156(3):722-728.
31. **Song J***, and Tanouye M (2007). Role for *para* sodium channel gene 3' UTR in the modification of *Drosophila* seizure susceptibility. **Dev Neurobiol** 67(14):1944-56.
32. **Song J***, Hu J and Tanouye M (2007). Seizure suppression by *top1* mutations in *Drosophila*. **J. Neuroscience** 27 (11): 2927-2937.
33. **Song J*** and Tanouye M (2006). Seizure suppression by *shakB²*, a gap junction mutation in *Drosophila*. **J. Neurophysiology** 95 (2): 627-635.

Review articles

34. Li YD[#], Luo YJ[#], **Song J*** (2023). Optimizing memory performance and emotional states: multi-level enhancement of adult hippocampal neurogenesis **Current Opinions in Neurobiology** Feb 21;79:102693.
35. Sheehy RN*, Quintanilla L, **Song J*** (2022). Epigenetic regulation in the neurogenic niche of the adult dentate gyrus. **Neuroscience Letter** Jan 1;766:136343.
36. Wander CM, Song J (2021). The neurogenic niche in Alzheimer's disease. **Neuroscience Letter** Sep 25;762:136109.
37. Bao H and **Song J*** (2018). Treating brain disorders by targeting adult neural stem cells. **Trends in Molecular Medicine**. 24(12): 991-1006

Cover article; Featured article

38. Catavero C, Bao H, **Song J*** (2017). Neural mechanisms underlying GABAergic regulation of adult hippocampal neurogenesis. **Cell and Tissue Research** pp1-14
39. Crowther AJ and **Song J*** (2014). Activity-dependent signaling mechanisms regulating adult hippocampal neural stem cells and their progeny. **Neuroscience Bulletin** 30(4):542-56
40. **Song J***, Crowther AJ, Olsen RHJ, Song H, and Ming GL (2014) A diametric mode of neuronal circuitry-neurogenesis coupling in the adult hippocampus via parvalbumin interneurons. **Neurogenesis** 1:e29949
41. **Song J**, Christian K, Ming GL, Song H (2012). Life or death: developing cortical interneurons make their own decision. **EMBO J** 31(23):4373-4

42. Bonaguidi MA[#], **Song J[#]**, Ming GL, Song H (2012). A unifying hypothesis on mammalian neural stem cell properties in the adult hippocampus. *Curr Opin Neurobiol.* 22(5):754-61
43. **Song J^{*}**, Christian K, Ming GL, Song H (2012). Modification of hippocampal circuitry by adult neurogenesis. *Dev Neurobiol.* 72(7):1032-43
44. **Song J** and Tanouye M (2008). From bench to drug: Human seizure modeling using *Drosophila*. *Progress in Neurobiology* 84(2):182-191.

BioRxiv preprints

45. Bao H, Hu Z, Lee SH, Kolagani R, Chao TH, Luo Y, Ban W, Sullivan HA, Gamero-Alameda S, Yu Y, Hsieh J, Wickersham I, Brenner SE, Shih YY, **Song J^{*}**. Dysregulation of hippocampal adult-born immature neurons disrupts a brain-wide network for spatial memory.
<https://doi.org/10.1101/2020.09.02.273649>
46. Quintanilla L, Su Y, Simon J, Luo Luo, Asrican B, Tart S, Sheehy RN, Li YD, Ming GL, Song H, **Song J^{*}**. Basal forebrain cholinergic circuits orchestrate diverse cell types in the adult dentate gyrus to support neural stem cell function and spatial memory.
<https://doi.org/10.1101/2022.05.25.493227>

PROFESSIONAL ACTIVITIES AND SERVICES

Memberships in Professional Societies

Society for Neuroscience (SFN)

International Society for Stem Cell Research (ISSCR)

Grant Reviewer

NIH study sections

Standing member (2021-2025): NCF (Neurogenesis and Cell Fates) 2021-2025

Ad hoc member: NAL (Neurotoxicology and Alcohol), NDPR (Neural Differentiation, Plasticity, and Rhythm), CDIN (Chronic Dysfunction and Integrative Neurodegeneration), ZRG1 MDCN-B, ZRG1 MDCN-G, ZAG1 ZIJ-6, BNCN.

Other international organizations

Alzheimer's Association, American Heart Association, Swiss National Science Foundation, Dutch Research Council

Symposium Session Chair

Asian-Pacific Society for Neurochemistry (2023), Spring Hippocampal Research Conference (2023), Molecular Psychiatry Association (2019), Society for Neuroscience (2019)

Journal Reviewer

Science, Neuron, Nature Neuroscience, Cell Stem Cell, Nature Medicine, Nature Communications, Science Advances, Molecular Psychiatry, Journal of Clinical Investigation, Brain, eLife, Cell Reports, PNAS, Journal of Neuroscience, Frontiers in Neuroscience, Frontiers in Molecular Neuroscience, Developmental Neurobiology, European Journal of Neuroscience; Journal of Neurochemistry, Neuroscience, Journal of Neurophysiology, Molecular Brain, Neural plasticity, Scientific Reports

Editorial Board

Journal of Neuroscience, Frontiers in Neuroscience