



Ryann Fame, PhD

Assistant Professor of Neurosurgery

CONTACT INFORMATION

- **Administrative Contact**

Liana Choi

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Bio

BIO

Ryann Fame PhD joined the faculty at Stanford University in 2022. Following her undergraduate degree in Biology and Chemistry at the College of William & Mary, Dr. Fame completed a PhD in Molecular and Cellular Biology at Harvard University. She conducted postdoctoral fellowships at The Whitehead Institute for Biomedical Research at MIT and at Boston Children's Hospital Pathology Department. Her research program encompasses the early neural stem cell niche, neural tube closure, cerebrospinal fluid (CSF), metabolism, and cortical neuronal development. As a stem cell and developmental molecular biologist, Dr. Fame is dedicated to broad collaboration focused on translating an understanding of neural development and CSF biology into regenerative strategies for the treatment of neurodevelopmental disease.

ACADEMIC APPOINTMENTS

- Assistant Professor, Neurosurgery
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Medicine Children's Health Center for IBD and Celiac Disease
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- BRF Seed Grant, Brain Research Foundation (BRF) (2024-2026)
- McCormick and Gabilan Faculty Award, Stanford University OFDD (2023-2025)
- Research Grant, The Shurl and Kay Curci Foundation (2023-2025)
- Hydrocephalus Innovator Award, Hydrocephalus Association (2022-2023)
- Office of Faculty Development Career Award, Boston Children's Hospital (2020-2022)
- Balkin-Markell-Weinberg Postdoctoral Fellow, The Whitehead Institute (2015-2016)
- NIH NRSA Graduate Research Fellow (F31), National Institutes of Health (NIH) (2010-2012)
- NSF Post Graduate Research Fellow, National Science Foundation (NSF) (2007-2010)
- Derek Bok Certificate of Distinction in Teaching, Harvard University (2007)

- Ashford Fellow, Harvard University (2006-2013)
- Vranos Fellow, Harvard University (2006-2007)
- Biology Departmental Senior Thesis Award, The College of William and Mary (2006)
- International Research Award, The College of William and Mary (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Society for Neuroscience (2007 - present)

PROFESSIONAL EDUCATION

- Instructor of Pathology, Boston Children's Hospital , Neurodevelopment (2022)
- Postdoctoral Fellow, The Whitehead Institutes for Biomedical Research at MIT , Neurodevelopment (2016)
- PhD, Harvard University , Stem Cell and Regenerative Biology (2013)
- AM, Harvard University , Molecular and Cellular Biology (2008)
- AB, The College of William and Mary , Biology and Chemistry (2006)

PATENTS

- Ryann Fame, Maria Lehtinen, Cameron Sadegh, Huixin Xu. "United States Patent WO-2022164451-A1 COMPOSITIONS AND METHODS FOR TREATING CEREBROSPINAL FLUID DISORDERS", Boston Children's Hospital, Sep 16, 2022

LINKS

- Fame Lab Website: <http://famelab.stanford.edu/>
- LinkedIn: <https://www.linkedin.com/in/ryannfame/>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Early neural progenitors respond to extrinsic cues that maintain and support their potency. These stem/ progenitor cells are in direct contact with the cerebrospinal fluid (CSF), which acts as part of their niche. Our research program encompasses the early neural stem cell niche, neural tube closure, CSF, metabolism, and cortical neuronal development. We are dedicated to broad collaboration focused on translating an understanding of neurodevelopment and CSF biology into regenerative strategies.

Teaching

COURSES

2025-26

- Neurosciences Development Core: NEPR 202 (Win)

2024-25

- Neuroscience Molecular Core: NEPR 204 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Pia Alderman, Sapeeda Barati, Jacqueline Bendrick, Andrea Navarrete Vargas

Postdoctoral Faculty Sponsor

Prashant Hariharan, Sonia Nan Kim, Luqing Liu, Shima Rastegar

Doctoral Dissertation Advisor (AC)

Sophia Mirda, Arjun Rajan, Sarah Rockwood, Blake Zhou

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Choroid plexus carcinoma: state of the field and emerging directions.** *Oncogenesis*
Thompson, A., Pescaru, H., Griffin, B., Fame, R. M.
2026
- **Clearance of intracranial debris by ultrasound reduces inflammation and improves outcomes in hemorrhagic stroke models.** *Nature biotechnology*
Azadian, M. M., Kiani Shabestari, S., Rajan, A., Martinez, P. J., Macedo, N., Markarian, E., Xiang, Y., Yu, B. J., George, P. M., Fame, R. M., Airan, R. D.
2025
- **Molecular hallmarks of hydrocephalus.** *Science translational medicine*
Hale, A. T., Zhou, B., Rajan, A., Duy, P. Q., Goolam, M., Alper, S. L., Lehtinen, M. K., Lancaster, M. A., Fame, R. M., Kahle, K. T.
2025; 17 (801): eadq1810
- **Harnessing the circadian nature of the choroid plexus and cerebrospinal fluid.** *Npj biological timing and sleep*
Fame, R. M.
2025; 2 (1): 19
- **Brain development and bioenergetic changes.** *Neurobiology of disease*
Rajan, A., Fame, R. M.
2024: 106550
- **Circadian Mechanisms in Brain Fluid Biology.** *Circulation research*
Vizcarra, V. S., Fame, R. M., Hablitz, L. M.
2024; 134 (6): 711-726
- **Optimized Mass Spectrometry Detection of Thyroid Hormones and Polar Metabolites in Rodent Cerebrospinal Fluid.** *Metabolites*
Fame, R. M., Ali, I., Lehtinen, M. K., Kanarek, N., Petrova, B.
2024; 14 (2)
- **Ependymal cells SCOr sweet cerebrospinal fluid.** *PLoS biology*
Liu, L. L., Fame, R. M.
2023; 21 (9): e3002323
- **Defining diurnal fluctuations in mouse choroid plexus and CSF at high molecular, spatial, and temporal resolution.** *Nature communications*
Fame, R. M., Kalugin, P. N., Petrova, B., Xu, H., Soden, P. A., Shipley, F. B., Dani, N., Grant, B., Pragana, A., Head, J. P., Gupta, S., Shannon, M. L., Chifamba, et al
2023; 14 (1): 3720
- **Age-appropriate potassium clearance from perinatal cerebrospinal fluid depends on choroid plexus NKCC1.** *Fluids and barriers of the CNS*
Fame, R. M., Xu, H., Pragana, A., Lehtinen, M.
2023; 20 (1): 45
- **Choroid plexus-targeted NKCC1 overexpression to treat post-hemorrhagic hydrocephalus.** *Neuron*
Sadegh, C., Xu, H., Sutin, J., Fatou, B., Gupta, S., Pragana, A., Taylor, M., Kalugin, P. N., Zawadzki, M. E., Alturkistani, O., Shipley, F. B., Dani, N., Fame, et al
2023
- **The choroid plexus: a missing link in our understanding of brain development and function.** *Physiological reviews*

Saunders, N. R., Dziegielewska, K. M., Fame, R. M., Lehtinen, M. K., Liddel, S. A.
2022

- **Cerebrovasculature pumps up progenitors.** *Cell*
Fame, R. M.
2022; 185 (20): 3645-3647
- **Disruption of GMNC-MCIDAS multiciliogenesis program is critical in choroid plexus carcinoma development.** *Cell death and differentiation*
Li, Q., Han, Z., Singh, N., Terré, B., Fame, R. M., Arif, U., Page, T. D., Zahran, T., Abdeltawab, A., Huang, Y., Cao, P., Wang, J., Lu, et al
2022; 29 (8): 1596-1610
- **Mitochondria in Early Forebrain Development: From Neurulation to Mid-Corticogenesis.** *Frontiers in cell and developmental biology*
Fame, R. M., Lehtinen, M. K.
2021; 9: 780207
- **MEIS-WNT5A axis regulates development of fourth ventricle choroid plexus.** *Development (Cambridge, England)*
Kaiser, K., Jang, A., Kompanikova, P., Lun, M. P., Prochazka, J., Machon, O., Dani, N., Prochazkova, M., Laurent, B., Gyllborg, D., van Amerongen, R., Fame, R. M., Gupta, et al
2021; 148 (10)
- **Choroid plexus NKCC1 mediates cerebrospinal fluid clearance during mouse early postnatal development** *NATURE COMMUNICATIONS*
Xu, H., Fame, R. M., Sadegh, C., Sutin, J., Naranjo, C., Syau, D., Cui, J., Shipley, F. B., Vernon, A., Gao, F., Zhang, Y., Holtzman, M. J., Heiman, et al
2021; 12 (1): 447
- **Tracking Calcium Dynamics and Immune Surveillance at the Choroid Plexus Blood-Cerebrospinal Fluid Interface.** *Neuron*
Shipley, F. B., Dani, N., Xu, H., Deister, C., Cui, J., Head, J. P., Sadegh, C., Fame, R. M., Shannon, M. L., Flores, V. I., Kishkovich, T., Jang, E., Klein, et al
2020; 108 (4): 623-639.e10
- **Brain Ventricular System and Cerebrospinal Fluid Development and Function: Light at the End of the Tube: A Primer with Latest Insights.** *BioEssays : news and reviews in molecular, cellular and developmental biology*
Fame, R. M., Cortés-Campos, C., Sive, H. L.
2020; 42 (3): e1900186
- **Emergence and Developmental Roles of the Cerebrospinal Fluid System.** *Developmental cell*
Fame, R. M., Lehtinen, M. K.
2020; 52 (3): 261-275
- **A concerted metabolic shift in early forebrain alters the CSF proteome and depends on MYC downregulation for mitochondrial maturation.** *Development (Cambridge, England)*
Fame, R. M., Shannon, M. L., Chau, K. F., Head, J. P., Lehtinen, M. K.
2019; 146 (20)
- **Targeting Peripheral Somatosensory Neurons to Improve Tactile-Related Phenotypes in ASD Models.** *Cell*
Orefice, L. L., Mosko, J. R., Morency, D. T., Wells, M. F., Tasnim, A., Mozeika, S. M., Ye, M., Chirila, A. M., Emanuel, A. J., Rankin, G., Fame, R. M., Lehtinen, M. K., Feng, et al
2019; 178 (4): 867-886.e24
- **Sister, Sister: Ependymal Cells and Adult Neural Stem Cells Are Separated at Birth by Geminin Family Members.** *Neuron*
Fame, R. M., Lehtinen, M. K.
2019; 102 (2): 278-279
- **Mice Expressing Myc in Neural Precursors Develop Choroid Plexus and Ciliary Body Tumors.** *The American journal of pathology*
Shannon, M. L., Fame, R. M., Chau, K. F., Dani, N., Calicchio, M. L., Géléoc, G. S., Lidov, H. G., Alexandrescu, S., Lehtinen, M. K.
2018; 188 (6): 1334-1344
- **Downregulation of ribosome biogenesis during early forebrain development.** *eLife*
Chau, K. F., Shannon, M. L., Fame, R. M., Fonseca, E., Mullan, H., Johnson, M. B., Sendamarai, A. K., Springel, M. W., Laurent, B., Lehtinen, M. K.
2018; 7

- **Caveolin1 Identifies a Specific Subpopulation of Cerebral Cortex Callosal Projection Neurons (CPN) Including Dual Projecting Cortical Callosal/Frontal Projection Neurons (CPN/FPN).** *eNeuro*
MacDonald, J. L., Fame, R. M., Gillis-Buck, E. M., Macklis, J. D.
2018; 5 (1)
- **Subtype-Specific Genes that Characterize Subpopulations of Callosal Projection Neurons in Mouse Identify Molecularly Homologous Populations in Macaque Cortex.** *Cerebral cortex (New York, N.Y. : 1991)*
Fame, R. M., Dehay, C., Kennedy, H., Macklis, J. D.
2017; 27 (3): 1817-1830
- **Directional cerebrospinal fluid movement between brain ventricles in larval zebrafish.** *Fluids and barriers of the CNS*
Fame, R. M., Chang, J. T., Hong, A., Aponte-Santiago, N. A., Sive, H.
2016; 13 (1): 11
- **Cited2 Regulates Neocortical Layer II/III Generation and Somatosensory Callosal Projection Neuron Development and Connectivity.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
Fame, R. M., MacDonald, J. L., Dunwoodie, S. L., Takahashi, E., Macklis, J. D.
2016; 36 (24): 6403-19
- **Development, specification, and diversity of callosal projection neurons.** *Trends in neurosciences*
Fame, R. M., MacDonald, J. L., Macklis, J. D.
2011; 34 (1): 41-50
- **SOX6 controls dorsal progenitor identity and interneuron diversity during neocortical development.** *Nature neuroscience*
Azim, E., Jabaudon, D., Fame, R. M., Macklis, J. D.
2009; 12 (10): 1238-47
- **Novel subtype-specific genes identify distinct subpopulations of callosal projection neurons.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
Molyneux, B. J., Arlotta, P., Fame, R. M., MacDonald, J. L., MacQuarrie, K. L., Macklis, J. D.
2009; 29 (39): 12343-54
- **Second-order projection from the posterior lateral line in the early zebrafish brain.** *Neural development*
Fame, R. M., Brajon, C., Ghysen, A.
2006; 1: 4
- **Specification of neurotransmitter phenotypes in *Xenopus laevis***
Golub, N. I., Fame, R. M., Saha, M. S.
ACADEMIC PRESS INC ELSEVIER SCIENCE.2006: 409