

NIH BIOGRAPHICAL SKETCH COMMON FORM

Name: KRIEGSTEIN, ARNOLD

Persistent Identifier (PID) of the Senior/Key Person: <https://orcid.org/0000-0001-5742-2990>

Position Title: Professor of Neurology

Organization and Location: UNIVERSITY OF CALIFORNIA, SAN FRANCISCO, San Francisco, California, United States

PROFESSIONAL PREPARATION

INSTITUTION AND LOCATION	DEGREE	Start Date	Completion Date	FIELD OF STUDY
New York University, New York, New York, New York, United States	DOCTOR OF MEDICINE	01/1971	01/1977	Medicine
New York University, New York, New York, New York, United States	DOCTOR OF PHILOSOPHY	01/1971	01/1977	Physiology
New York University, New York, New York, USA	MASTER OF SCIENCE		06/1974	Physiology
Yale University, New Haven, CT, USA	BACHELOR OF ARTS		06/1971	Biology/Psychology

Appointments and Positions

2004 - present	Professor of Neurology, UNIVERSITY OF CALIFORNIA, SAN FRANCISCO, San Francisco, California, United States
2008 - 2021	Director, Eli and Edythe Broad Center of Regeneration Medicine and Stem Cell Research at UCSF, UCSF, San Francisco, California, United States
2006 - 2021	John G. Bowes Distinguished Professor, University of California, San Francisco, CA, UCSF, San Francisco, California, United States
2004 - 2021	Director Program Developmental & Stem Cell Biology, UCSF, San Francisco, CA, UCSF, San Francisco, California, United States
2001 - 2004	John and Elisabeth Harris Professor of Neurology, Columbia Univ., New York, NY, Columbia University, New York, New York, United States
1999 - 2001	Professor of Neurology, Columbia Univ., New York, NY, Columbia University, New York, New York, United States
1994 - 1999	Associate Professor of Neurology, Columbia Univ., New York, NY, Columbia University, New York, New York, United States
1991 - 1993	Assoc. Research Scientist, Yale University, New Haven, CT, Yale University, New Haven, Connecticut, United States
1991 - 1993	Clinical Associate Professor, Yale University, New Haven, CT, Yale University, New Haven, Connecticut, United States
1988 - 1991	Associate Professor of Neurology, Stanford University, Stanford, CA, Stanford University, Stanford, California, United States
1981 - 1988	Assistant Professor of Neurology, Stanford University, Stanford, CA, Stanford University, Stanford, California, United States
1978 - 1981	Neurology Resident, The Beth Israel, Brigham & Boston Children's Hospital, Boston, MA, Harvard University, Boston, Massachusetts, United States

Products**Products Closely Related to the Proposed Project**

1. Velmeshev D, Perez Y, Yan Z, Valencia JE, Castaneda-Castellanos DR, Wang L, Schirmer L, Mayer S, Wick B, Wang S, Nowakowski TJ, Paredes M, Huang EJ, Kriegstein AR. Single-cell analysis of prenatal and postnatal human cortical

development. Science. 2023 Oct 13;382(6667):eadf0834. PubMed Central PMCID: [PMC11005279](#).

2. Wang L, Pang K, Zhou L, Cebrián-Silla A, González-Granero S, Wang S, Bi Q, White ML, Ho B, Li J, Li T, Perez Y, Huang EJ, Winkler EA, Paredes MF, Kovner R, Sestan N, Pollen AA, Liu P, Li J, Piao X, García-Verdugo JM, Alvarez-Buylla A, Liu Z, Kriegstein AR. A cross-species proteomic map reveals neoteny of human synapse development. Nature. 2023 Oct;622(7981):112-119. PubMed Central PMCID: [PMC10576238](#).
3. Bhaduri A, Sandoval-Espinosa C, Otero-Garcia M, Oh I, Yin R, Eze UC, Nowakowski TJ, Kriegstein AR. An atlas of cortical arealization identifies dynamic molecular signatures. Nature. 2021 Oct;598(7879):200-204. PubMed Central PMCID: [PMC8494648](#).
4. Eze UC, Bhaduri A, Haeussler M, Nowakowski TJ, Kriegstein AR. Single-cell atlas of early human brain development highlights heterogeneity of human neuroepithelial cells and early radial glia. Nat Neurosci. 2021 Apr;24(4):584-594. PubMed Central PMCID: [PMC8012207](#).
5. Huang W, Bhaduri A, Velmeshev D, Wang S, Wang L, Rottkamp CA, Alvarez-Buylla A, Rowitch DH, Kriegstein AR. Origins and Proliferative States of Human Oligodendrocyte Precursor Cells. Cell. 2020 Aug 6;182(3):594-608.e11. PubMed Central PMCID: [PMC7415734](#).

Other Significant Products Highlighting Contributions to Science

1. Noctor SC, Flint AC, Weissman TA, Dammerman RS, Kriegstein AR. Neurons derived from radial glial cells establish radial units in neocortex. Nature. 2001 Feb 8;409(6821):714-20. PubMed PMID: [11217860](#).
2. Kriegstein A, Alvarez-Buylla A. The glial nature of embryonic and adult neural stem cells. Annu Rev Neurosci. 2009;32:149-84. PubMed Central PMCID: [PMC3086722](#).
3. Noctor SC, Martínez-Cerdeño V, Ivic L, Kriegstein AR. Cortical neurons arise in symmetric and asymmetric division zones and migrate through specific phases. Nat Neurosci. 2004 Feb;7(2):136-44. PubMed PMID: [14703572](#).
4. Hansen DV, Lui JH, Parker PR, Kriegstein AR. Neurogenic radial glia in the outer subventricular zone of human neocortex. Nature. 2010 Mar 25;464(7288):554-561. PubMed PMID: [20154730](#).
5. Lui JH, Hansen DV, Kriegstein AR. Development and evolution of the human neocortex. Cell. 2011 Jul 8;146(1):18-36. PubMed Central PMCID: [PMC3610574](#).

Certification:

I certify that the information provided is current, accurate, and complete. This includes but is not limited to information related to domestic and foreign appointments and positions.

I also certify that, at the time of submission, I am not a party to a malign foreign talent recruitment program.

Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

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NIH BIOGRAPHICAL SKETCH SUPPLEMENT

Name: KRIEGSTEIN, ARNOLD

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Personal Statement

I am a clinician-scientist, a licensed, board-certified neurologist as well as a developmental neurobiologist. I am Founding Director of the Eli and Edythe Broad Center of Regeneration Medicine and Stem Cell Research at UCSF where for 17 years I created and oversaw one of the largest and most comprehensive stem cell programs in the US, encompassing over 70 laboratories focused on disorders ranging from heart disease and diabetes to cancer and diseases of the nervous system. As part of this effort, I recruited and mentored over 18 faculty members ranging from assistant to full professors.

The long-standing goal of my lab is to understand how neuronal diversity is generated during cortical development. We have applied cell biological, electrical and optical recording, real-time imaging, and single cell genomic approaches to classify cell types in the developing brain. Over the past decade, we have applied innovative strategies for massively parallel profiling of molecular and physiological properties of primary human cortical cells. We have compiled a single cell census of the developing human cerebral cortex based on single cell RNA and ATAC sequencing and are extending this analysis to multiple brain regions across development and to macaque monkeys and marmosets. We have also applied single cell multiomics to compare primary human cortex to cortical organoids identifying molecular and cellular convergence and divergence. We have also created scalable cellular resolution maps of the developing human neocortex to unravel the diversity of cortical neurons and non-neural cells, and to support stem cell-based models and therapies for neurodevelopmental diseases.

Throughout my laboratory career of over 35 years, I always prioritize training and mentoring of students and postdoctoral trainees. I serve on multiple graduate school thesis and qualifying exam committees, lecture in graduate school courses and co-direct a workshop on organoids. I recruit, interview and train clinician-scientists as a member of the MSTP Council and oversee graduate student training as my role on the DSCB Executive Committee and the Executive Board of the Weill Institute for Neurosciences.

Honors

2025 - 2033	Outstanding Investigator Award, NINDS
2022	Heller Lectureship in Computational Neuroscience, Hebrew University of Jerusalem
2021	F.E.Bennett Memorial Lectureship Award, American Neurological Association
2017 - 2025	Outstanding Investigator Award, NINDS
2013	Astor Visiting Professor, University of Oxford
2011	The Solomon A. Berson NYU Medical Alumni Achievement Award , NYU
2011 - 2018	Javits Neuroscience Investigator Award, NINDS
2008	Cotzius Award, American Academy of Neurology
2008	Elected to the National Academy of Medicine, National Academy of Medicine
2006	Hunt-Wilson Lecturer, American Association of Neurological Surgeons
1999 - 2006	Javits Neuroscience Investigator Award , NINDS
1986	William M. Hume Faculty Scholar , Stanford University
1983	Diplomate in Neurology, Board of Psychiatry and Neurology
1982 - 1984	Mellon Scholar, Stanford University
1981 - 1984	Klingenstein Fellow, Klingenstein Phillanthropies

Contributions to Science

1. Dr. Kriegstein's lab discovered that radial glial cells, long thought to simply guide nerve cells during migration, are neural stem cells in the developing brain. This concept, unexpected at the time, is now one of the tenets of developmental

neuroscience. He described a second class of progenitor cells, he termed ‘intermediate progenitor cells,’ produced by radial glia. This finding established a new mechanism for the generation of cell diversity in the developing brain. Dr. Kriegstein has also characterized progenitor cells in human cortical development. He discovered that the outer subventricular zone, a progenitor region in the developing human brain, contains a subtype of radial glia he called the ‘outer radial glia’ (oRGs). He also described a cell division behavior of oRG cells he termed ‘mitotic somal translocation’ unique to this progenitor cell that helps explain how the OSVZ expands during brain development. It is now universally agreed that oRG cells contribute to the developmental and evolutionary expansion of the human cerebral cortex and are particularly important for producing neurons of the upper cortical layers.

Dr. Kriegstein has also been an early adaptor of single cell RNA sequencing and has applied this technology to discover molecular features of specific cell types in the developing human brain. He discovered differentially expressed genes in specific human progenitor cell populations providing novel markers for cell types such as oRG cells. Kriegstein’s work has also provided insights into the role of these cells in normal development and disease. He discovered that the radial glial scaffold becomes discontinuous about halfway through human cortical neurogenesis, and that oRGs produce the upper layer neurons in humans helping to explain the primate-specific enlargement of the upper cortical layers.

Dr. Kriegstein’s research has also addressed disorders such as glioblastoma, lissencephaly, Zika microcephaly, and autism.

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