Seth A. Brodie, Ph.D.

Single-Cell Genomics Consultant

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Molecular biologist with twenty years in oncology, genomics and epigenetics — spanning academic research, the National Cancer Institute, and instrumentation R&D. Deep hands-on experience across single-cell platforms, assay development and difficult sample preparation.

EXPERIENCE

Levitas Bio April 2021 – August 2026

Associate Director, Research and Development — Biology

- Project lead on development of applications and products complementing a portfolio of tools using magnetic levitation for cellular sample preparation.
- Developed nuclei extraction and purification methods for single-cell and single-nuclei genomics.
- Led cellular phenotype assays and screens, and drug discovery assay development.
- Application development on a high-throughput screening automation platform.
- Customer-facing: field demonstrations, installation and team training.

Factorial Bio 2024

Consultant

- Advised the CEO and CTO on single-cell sequencing applications and methods.

National Cancer Institute / Leidos Biomedical Research 2015 – April 2021

Senior Scientist — Functional Genomics, Cancer Genome Research Lab

- Team manager and lead scientist on projects discovering and validating the biological function of rare genomic variants in cancers and hematological syndromes.
- NAT10/ThumpD1 variants affecting tRNA biology in bone marrow failure syndromes; IKZF1 variants affecting hematopoiesis; variant-driven alternative splicing.
- snCNVseq and snRNAseq to characterize tumor heterogeneity and metastatic evolution.
- Member of a molecular tumor board — assessed variants of unknown significance for patient inclusion in a clinical trial of Olaparib (NCT03375307).
- Primary consultant to Principal Investigators on functional genomics studies.
- Managed a team of research associates and post-baccalaureate scientists, and a $100K annual budget.

SCIENTIFIC TRAINING

Emory University, Winship Cancer Institute — Hematology & Oncology 2010 – 2015

Postdoctoral Fellow, laboratory of Dr. Johann Brandes

Epigenetic reprogramming in lung cancer

Emory University — Cardiology & Biomedical Engineering 2007 – 2009

Postdoctoral Fellow, NIH-NRSA Fellow, laboratory of Dr. Hanjoong Jo

BMPRII signaling in atherosclerosis

University at Buffalo — Biochemistry & Center of Excellence in Bioinformatics 2005 – 2007

Postdoctoral Research Associate, laboratory of Dr. Marc Halfon

Pox-Meso in somatic muscle development

EDUCATION

University at Buffalo 2005

Ph.D., Biochemistry

Structure-function studies of the Tfg2 subunit of *S. cerevisiae* transcription factor TFIIF. Laboratory of Dr. Alfred Ponticelli.

Lehigh University 1999

B.S., Molecular Biology (minor, Anthropology)

HHMI Undergraduate Research Fellowship, 1998–1999.

TECHNICAL EXPERTISE

Single-cell & sequencing	10x Genomics, Illumina PIPseq, Scale, Parse, MissionBio Tapestri, Fluidigm C1; Illumina and Ion Torrent NGS — Ampliseq, RNAseq, ChIPseq, RIPseq
Sample preparation	Magnetic-levitation tissue, cell and nuclei preparation; FFPE tumor analysis — IHC, H&E, nucleic acid and single-nuclei extraction, spatial
Cell biology	2D and 3D human primary culture (PBMC, epithelial, endothelial), cancer and immortalized lines, hypoxia, transfection, viral production and transduction, CRISPR, siRNA/shRNA
Assays & analysis	Assay and method development, ACEA real-time cellular analysis, proximity ligation, drug sensitivity and resistance; flow cytometry and sorting; confocal, fluorescent and live-cell imaging; qPCR
Epigenetics	DNA methylation and histone modification
Computational	CellRanger, Seurat, Seven Bridges Genomics, Galaxy, Ingenuity, GeneGO, JMP; protein homology modeling and docking
Other	Surface plasmon resonance (SPR); xenograft models and husbandry; protein expression, purification and analysis

PATENTS

Particle Separator System, Materials, and Methods of Use

U.S. Patent Application No. 18/604,367

INVITED PRESENTATIONS

Magnetic Levitation Enables Preclinical Target and Translational Discoveries

St. Jude Children's Research Hospital, Memphis, TN · September 2025

Levitation enables the use of challenging samples

UCSF Diller Family Comprehensive Cancer Center, San Francisco, CA · September 2024

Using Magnetic Levitation as a Label-Free Sample Preparation Method for Functional and Single Cell Genomics Applications

Egypt-Japan University of Science and Technology, Alexandria (webinar) · November 2021

PUBLICATIONS

23 peer-reviewed papers, 9 as first or co-first author.

Xia B, Biswas K, Foo TK, et al. (incl. **Brodie SA**) Rare germline variants in PALB2 and BRCA2 in familial and sporadic chordoma. *Human Mutation*, 2022.

Colli LM, Jessop L, Myers TA, et al. (incl. **Brodie SA**) Altered regulation of DPF3, a member of the SWI/SNF complexes, underlies the 14q24 renal cancer susceptibility locus. *American Journal of Human Genetics*, 2021.

Brodie SA, Khincha PP, Giri N, et al. Pathogenic germline IKZF1 variant alters hematopoietic gene expression profiles. *Cold Spring Harbor Molecular Case Studies*, 2021.

Kim J, Gianferante M, Karyadi DM, et al. (incl. **Brodie SA**) Frequency of pathogenic germline variants in cancer-susceptibility genes in the Childhood Cancer Survivor Study. *JNCI Cancer Spectrum*, 2021.

Fadl BR, **Brodie SA**, Malasky M, et al. An optimized protocol for retina single-cell RNA sequencing. *Molecular Vision*, 2020.

Zhu B, Poeta ML, Costantini M, et al. (incl. **Brodie S**) The genomic and epigenomic evolutionary history of papillary renal cell carcinomas. *Nature Communications*, 2020.

Brodie SA, Rodriguez-Aulet JP, Giri N, et al. 1q21.1 deletion and a rare functional polymorphism in siblings with thrombocytopenia-absent radius-like phenotypes. *Cold Spring Harbor Molecular Case Studies*, 2019.

Kim J, Luo W, Wang M, et al. (incl. **Brodie SA**) Prevalence of pathogenic/likely pathogenic variants in the 24 cancer genes of the ACMG Secondary Findings v2.0 list in a large cancer cohort and ethnicity-matched controls. *Genome Medicine*, 2018.

Mirabello L, Khincha PP, Ellis SR, et al. (incl. **Brodie S**) Novel and known ribosomal causes of Diamond-Blackfan anaemia identified through comprehensive genomic characterisation. *Journal of Medical Genetics*, 2017.

Nickerson ML, Das S, Im KM, et al. (incl. **Brodie SA**) TET2 binds the androgen receptor and loss is associated with prostate cancer. *Oncogene*, 2017.

Shi J, Hua X, Zhu B, et al. (incl. **Brodie SA**) Somatic genomics and clinical features of lung adenocarcinoma: a retrospective study. *PLoS Medicine*, 2016.

Brodie SA, Li G, Harvey D, Khuri FR, Vertino PM, Brandes JC. Small molecule inhibition of the CHFR-PARP1 interaction as novel approach to overcome intrinsic taxane resistance in cancer. *Oncotarget*, 2015.

Brodie SA, Li G, Brandes JC. Molecular characteristics of non-small cell lung cancer with reduced CHFR expression in The Cancer Genome Atlas (TCGA) project. *Respiratory Medicine*, 2015.

Brodie SA, Lombardo C, Li G, et al. Aberrant promoter methylation of caveolin-1 is associated with favorable response to taxane-platinum combination chemotherapy in advanced NSCLC. *PLOS ONE*, 2014.

Brodie SA, Li G, El-Kommos A, et al. Class I HDACs are mediators of smoke-carcinogen induced stabilization of DNMT1 and serve as promising targets for chemoprevention of lung cancer. *Cancer Prevention Research*, 2014.

Brodie SA, Brandes JC. Could valproic acid be an effective anticancer agent? The evidence so far. *Expert Review of Anticancer Therapy*, 2014.

Kang H, Gillespie TW, Goodman M, et al. (incl. **Brodie SA**) Long-term use of valproic acid in United States veterans is associated with reduced risk of smoking-related head and neck cancers. *Cancer*, 2014.

Kim CW, Song H, Kumar S, et al. (incl. **Brodie S**) Anti-inflammatory and anti-atherogenic role of BMP receptor II in endothelial cells. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 2013.

Pillai RN*, **Brodie SA***, Sica GL, et al. CHFR protein expression predicts outcomes to taxane-based first line therapy in metastatic NSCLC. *Clinical Cancer Research*, 2013.

Tiwari D, **Brodie SA**, Brandes JC. Targeted therapy of NSCLC. *Therapeutic Advances in Respiratory Disease*, 2012.

Ghazy MA*, **Brodie SA***, Ammerman ML, Ziegler LM, Ponticelli AS. Amino acid substitutions in yeast TFIIF confer upstream shifts in transcription initiation and altered interaction with RNA polymerase II. *Molecular and Cellular Biology*, 2004.

Faitar SL, **Brodie SA**, Ponticelli AS. Promoter-specific shifts in transcription initiation conferred by yeast TFIIB mutations are determined by the sequence in the immediate vicinity of the start sites. *Molecular and Cellular Biology*, 2001.

Vander Zwan C, **Brodie SA**, Campanella JJ. The intraspecific phylogenetics of *Arabidopsis thaliana* in worldwide populations. *Systematic Botany*, 2000.

EDITORIAL & REVIEW SERVICE

Clinical Trial Genetics Review Panel, 2017–2021 — Phase II study of Olaparib in metastatic/advanced urothelial carcinoma with DNA-repair defects (NCI/AstraZeneca)

Ad hoc reviewer — *Cancer Research* (2018–2020), *Brazilian Journal of Medical and Biological Research* (2018–2020), *PLOS Genetics* (2017), *Cancer* (2014), *Journal of Clinical Oncology* (2014)

TEACHING & MENTORING

Gwinnett School of Mathematics, Science and Technology 2009 – 2010

Teacher, Science Department — developed curriculum for two new advanced biology courses

Emory University, Department of Biology 2008 – 2009

Lecturer, Foundations of Modern Biology Laboratory I & II

University at Buffalo, Department of Biochemistry 2001 – 2007

Lecturer, graduate-level biochemistry; instructor, MED STEP program; teaching assistant

PROFESSIONAL MEMBERSHIPS

AACR (2011–2022) · IASLC (2012–2022) · ASHG (2020–2022)