Curriculum Vitae

Date Prepared:	**July 2, 2018**
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Place of Birth::	**Austin, TX**

Education

1989	B.A.	Biochemistry	Rice University, Houston, TX
1996	Ph.D.	Biochemistry and Molecular Biology	The University of Texas-M.D. Anderson Cancer Center/ The University of Texas-Houston Graduate School of Biomedical Sciences M.D/Ph.D. Program, Houston, TX
1997	M.D.	Medicine	The University of Texas Houston Medical School - M.D. Ph.D. Program Houston, TX

Postdoctoral Training

1997-1999	Resident	Anatomic Pathology	Brigham and Women's Hospital
1997-2001	Clinical Fellow	Pathology	Harvard Medical School

1999-2001	Clinical Fellow	Neuropathology	Brigham and Women's Hospital
2001-2002	Research Fellow	Pediatric Oncology	Dana-Farber Cancer Institute

Faculty Academic Appointments

2002-2007	Instructor	Pathology	Harvard Medical School
2007-2015	Assistant Professor	Pathology	Harvard Medical School
2015-	Associate Professor	Pathology	Harvard Medical School
2015-	Associate Member	Cancer Program	Broad Institute of Harvard and MIT Cambridge, MA

Appointments at Hospitals/Affiliated Institutions

2001-	Associate Pathologist	Pathology (Neuropathology)	Brigham and Women's Hospital
2001-	Consultant	Pathology (Neuropathology)	Boston Children's Hospital

Other Professional Positions

2014	Scientific Advisory Board	Midatech LLC, Oxford, UK
2016-	GBM SPORE External Advisory Board	MD Anderson Cancer Center, Houston, TX
2017-	Founding Scientific Advisor	Travera, LLC

Major Administrative Leadership Positions
Local

2009-	Vice-Director, Neuropathology	Brigham and Women's Hospital
2016-	Chief, Neuropathology	Brigham and Women’s Hospital
2016-	Director, Center for Patient Derived Models	Dana-Farber Cancer Institute

Committee Service

Local

2001-2005	Pathology Computing	Brigham and Women's Hospital
2001-2005	Pathology Web Committee	Brigham and Women's Hospital
2005-2008	BWH Neurosciences Executive Steering Committee	Brigham and Women's Hospital
2009-	BWH Residency Selection Committee	Brigham and Women's Hospital
2010-	IACUC Committee	Dana-Farber Cancer Institute
2011-	Brigham Research Institute Neurosciences Research Center Working Group	Brigham and Women's Hospital
2013	Joint Center for Precision Medicine Steering Committee	Dana-Farber Cancer Institute
2016-	Committee for Women Faculty	Dana-Farber Cancer Institute
2017-	Brigham Research Institute Neuroscience Imaging Studio Group	Brigham and Women's Hospital

Professional Societies

1995-2000	American Medical Association	Member
1997-	Massachusetts Medical Society	Member
1998-	United States-Canadian Academy of Pathology	Member
1998-	ASCP/ College of American Pathologists	Member
2001-	American Association of Neuropathologists	Member, Awards Committee
2006-	American Association of Cancer Research	Member
2009-	Society for Neuro-Oncology	Member Executive Committee, 2015-16
2018-	Society for Functional Precision Medicine	Secretary

Grant Review Activities (*ad hoc Reviewer)*

2006	Veterans Affairs Health Care System
2006	Children's Brain Tumor Foundation
2012	French Society for Neurosciences

Editorial Activities (*ad hoc Reviewer)*

Acta Neuropathologica

Brain Pathology

Cancer Cell

Cancer Research

Cell Stem Cell

Clinical Cancer Research

Genes and Development

Journal of Comparative Neurology

Journal of Neuropathology and Experimental Neurology

Journal of Neuroscience

Molecular Systems Biology

Nature Genetics

Nature Communications

Nature Medicine

Neuro-Oncology

Neuropathology and Applied Neurobiology

New England Journal of Medicine

Pediatric and Developmental Pathology

Proceedings of the National Academy of Science

Stem Cells

Other Editorial Roles

2010-2013	Editorial Board Member	Clinical Cancer Research
2010-	Editorial Board Member	Neuro-Oncology

Honors and Prizes

1985-1989	National Merit Scholar	Rice University

1986	Sir Alexander Fleming Scholar	Oklahoma Medical Research Foundation
1989-1992	Academic Scholar	University of Texas- Houston Medical School
2006	Matthew T. Moore Distinguished Lecture in Neuropathology	International Congress of Neuropathology
2006	Research Award	Brigham Research Institute Cancer Center
2007	Memorial Peter A. Steck Award in Brain Tumor Research	Pediatric Brain Tumor Foundation
2008	Dunkin Donuts Rising Star Award for Research	Dana-Farber Cancer Institute
2009-13	Distinguished Scientist Award	Sontag Foundation

Report of Funded and Unfunded Projects

Funding Information

Past Funded

2004-2010	PI, NINDS *Olig function in CNS development and tumorigenesis (K08NS047213)*
2007-2010	PI, Barr Foundation Award *GBM cancer stem cell transcription factor networks as therapeutic targets*
2008-2009	PI, Dunkin Donuts Rising Star Award, *Cellular and molecular phenotyping of glioma stem cell lines*
2008-2011	PI, Goldhirsh Foundation, *Stem and progenitor cell transcription factor networks as therapeutic targets in GBM*
2008-2013	PI, Sontag Foundation, 2009 Distinguished Scientist Award *Sox2 Function in Stem Cells and Glioma*
2008-2013	Core Director, NIH/NINDS Program Project, (Ron DePinho, PI) *Genetics and Biology of Glioblastoma* (*5P01CA095616-09)*
2009-2017	*Ivy Foundation Early Phase Clinical Trial Consortium* Ivy Foundation Research Project Site PI (PI: Mike Prados, Total Direct Cost: $32,427) This project creates a clinical trials consortium to conduct clinical trials in glioblastoma. The aims are to a) conduct small molecularly-enriched clinical trials and identify if this strategy results in efficient discovery of targeted drugs; b) create a virtual tissue bank, profiling up to 250 newly diagnosed patients per year as candidates for clinical trials at relapse; and c) to create an infrastructure for biopharmaceutical support to sustain the consortium beyond the foundation support period.
2010-2011	PI, Plexxikon Inc., Sponsored Research Agreement, *CSFRI inhibitor efficacy in Glioblastoma Stem Cell Lines.*
2011-2016	NIH/NCI 2R01NS057727 Stiles (PI) *OLIG2 Phosphorylation as a Drug Target for Glioma*

	The goals of this proposal are to study the transcriptional and phosphorylation networks of OLIG2 in human and murine glioblastoma models and cell lines. Role: Co-Investigator
2011-2017	NIH/NCI P01 CA142536 Therapeutic Opportunities for Pediatric Astrocytoma
2012-2013	PI, Glaxo Smith Kline Inc., Sponsored Research Agreement, IDH *inhibitors in Glioblastoma*
2012-2013	PI, Children's Hospital Team Path to the Cure, *Whole Exome Sequencing in Pediatric Low Grade Astrocytomas*
2012-2013	Co-Investigator, Breast Cancer Research Foundation (N. Lin, PI) *Novel Approaches for Brain Metastases from Brain Cancer*
2012-2014	*Single cell sequencing and secretion profiling in GBM* DFHCC/Koch Institute Bridge Project Grant Principal Investigator –(MPI grant with Dr. Meyerson, Love) Project is collaboration of Ligon, Matthew Meyerson (DFCI), and Chris Love (Koch Institute/MIT) labs to characterize the genomic and expression heterogeneity of GBM samples at a single cell level resolution.
2012-2014	*Accelerating the Translation of PI3K-Targeted Therapy for HER2+Breast Cancer Brain Metastases* DF/HCC BGC Pilot Award Co-Investigator (PI: Zhou) The goal of this proposal is to study PI3K inhibitors effect on brain metastases in breast cancer.
2012-2017 NCE	*Assaying GBM growth and therapy response in single cells and tumorspheres (PQ17)*
2017-2018	NIH/NCI RO1CA170592 Co- Principal Investigator (MPI/PD grant with Dr. S. Manalis Direct Total Cost: $762,000) The specific aims of this provocative question (PQ) award are focused on studying the biology of GBM cell growth at the single cell level with a novel microfluidic device capable of measuring live cell growth in minutes and the cell response to targeted therapy. The eventual goal is to develop the device as a diagnostic tool.
2011-2017	*Therapeutic Opportunities for Pediatric Astrocytoma* NIH/NCI P01 CA142536 Core Director (PI: Segal, Total Direct Cost: $177,519) The program goals are to combine data from genomic profiling of rare human pediatric astrocytoma samples with functional genomics and preclinical testing of novel therapeutic compounds in human and mouse astrocytoma models for discovery of novel treatments for pediatric astrocytoma.
2015 – 2017	*Randomized Phase IIB Open Label Study of Nivolumab or Nivolumab in combination with Ipllimumab versus Bevacizumab in Adult Subjects with Recurrent Glioblastoma*

	Bristol-Myers Squibb Company Sponsored Research Agreement Principal Investigator (Direct Total Cost: $231,707) 1) Generate central histopathologic review and assessment 2) Reports to provide standard assessment as to possible changes or reactions related to treatments versus evidence and degree of tumor regrowth and/or progression. 3)Collection of standardized data as to tumor growth and response, 4)Minimize any Inter-observer variation in the histopathologic assessment of progression versus treatment-related changes. 5)Central review report provided back to local site for aid in per protocol decision as to whether continue or discontinue patient on experimental therapy. 6)Exploratory studies to investigate pathologic response assessment methods in the general setting of treatment.
2016 – 2017	*Intratumoral heterogeneity of resistance drivers in Diffuse Intrinsic Pontine Glioma* St. Baldrick's Foundation Research Award Principal Investigator (MPI Grant with R. Beroukhim, Total Direct Cost: $13,162) This project will test the hypothesis that intratumoral heterogeneity in driver genomic alterations contribute to DIPG resistance and that mapping of this heterogeneity is necessary to increase the efficacy of current therapies.
2016-2018	*Circumventing Barriers to Effective Oncolytic Virotherapy of Malignant Gliomas* NIH/NCI P01 CA163205 Core Director (PI: Caligiuri, Total Direct Cost: $60,896) The goal of this proposal is to create patient cell line models of brain tumors that can be used to study and test new strategies for viral immunotherapy and new treatments for brain tumors.
2016 – 2018	*Preclinical evaluation of MDM2 inhibitor, AMG232, in combination with radiation therapy in genetically characterized patient derived models of glioblastoma* Amgen Inc., Sponsored Research Agreement Principal Investigator (Direct Total Costs: $50,641) Our primary study aim is to perform an in vivo preclinical trial of the MDM2 inhibitor AMG232 in combination with radiation therapy (RT) in both patient derived cell lines (PDCL) and patient derived xenografts (PDX) of pediatric and adult GBM. Our secondary aim will be to explore the specific genetic profile that might best predict response to single or combination therapy as well as to identify pharmacodynamic (PD) biomarkers that would indicate on target effect and response (e.g. IHC for p21, CC3, MDM2).
2016 – 2017	*Effects of TG02 on GBM* Tragara Pharmaceuticals, Inc. Principal Investigator (Direct Total Costs: $57,108)

Investigating the effect of CDK antagonism of glioblastoma tumor progression in murine models and in vitro using Tragara Pharmaceuticals' proprietary CDK antagonist, TG02.

2016 – 2017 *X4 Research Support Agreement*
X4 Pharmaceuticals, Inc.
Principal Investigator (Direct Total Costs: $59,142)
Investigating the effect of CXCR4 antagonism on glioblastoma tumor progression in murine models using X4 Pharmaceuticals' proprietary CXCR4 antagonists including X4-136.

2016 – 2017 *Central Pathology Correlative Studies for An Open label Phase 1b/2 Study of Orally Administered PLX3397 in Combination with Radiation Therapy and Temozolomide in Patients with Newly Diagnosed GBM*
Plexxikon Inc. PLX108-08
Principal Investigator (Direct Total Costs: $43,893)
This SRA was a collaboration for the DFCI and Ligon lab to provide central pathology review and biomarker analysis of subjects who had enrolled to national clinical trial PLX108-08 (DFCI IRB #13-347; NCT01790503) clinical trial evaluating a CSF1R inhibitor in newly diagnosed GBM patients.

Current Funded

2013-2018 *Evaluation of MYBL1 fusion oncogene in pediatric diffuse astrocytoma*
PLGA Foundation Research Award
Role: Principal Investigator (Direct Total Cost: $536,000)
The specific aims of this project are 1) Construction of transgenic mouse models with genetic loss-of-function or-gain-of function in the brain; 2) Evaluation of the outcomes of patients found to have MYBL1 using IHC and bioinformatics approaches

2013-2018 *Targeted Therapies for Glioma*
NIH/NCI P50CA165962 Batchelor (PI)
Co-Investigator (Project 2), Core Director (Neuropathology Core)
The goal of this SPORE award is to develop targeted therapies for glioma. Dr. Ligon's lab will study IDH as a therapeutic target in gliomas as part of Project 2. His lab also co-directs the Neuropathology Core.

2015 – 2018 *Clinical Trial CNS Tissue Pathologic Analyses*
Plexxikon DF/PCC 11-468
Principal Investigator (Direct Total Cost: $86,806)
The goal of this project is to perform central neuropathologic correlatives analysis of a national clinical trial of PLX3397 inhibitor of CSF1R and effects on GBM cells as well as the microglia/macrophage and other immune cell responses in patient GBM samples from the trial.

2015-2020 *Genetic evolution of glioblastomas during radiation and temozolomide therapy*

NIH/NCI R01CA188288
Principal Investigator (MPI/PD grant with Dr. R. Beroukhim, Total Direct Cost: $172,097)
The specific aims of this proposal are focused on analysis of the effects of radiation and temozolomide on patients with glioblastoma by analysis of patient specimens and patient derived models using bulk and single cell genomics approaches. The overall goal is to identify resistance pathways that may be targeted with new more effective treatments.

2016-2018 *DF/HCC - Koch Institute Bridge Project*
DF/HCC - Koch Institute Bridge Project Grant
Principal Investigator (Direct Total Cost: $121,434)
The specific aims of this project are 1) Determining novel combination therapies for pediatric High-Grade Glioma and Diffuse Intrinsic Pontine Glio; 2) Improving treatment of pediatric high-grade gliomas using tumor targeted nanoparticles and combined therapeutic approaches

2016 – 2018 *Genomic and Immunologic Changes after Therapy in DIPG*
Bristol-Myers Squibb Company
Principal Investigator (Direct Total Costs: $114,300)
The specific aims of the project are to combine genomic and immunohistochemistry techniques to understand local, loco-regional and distant failures after therapy.

2017-2022 *MYB family alterations in pediatric gliomas*
NIH/NCI R01 CA215489
Principal Investigator (MPI with Beroukhim/ Marto/ Buhrlage, Total Direct Cost: $204,056)
The specific aims of this project are to: 1) Test the hypothesis that MYB and MYBL1 alterations contribute to tumorigenesis via distinct but related mechanisms, 2) Test the hypothesis that the MYB fusion partner QKI contributes to tumorigenesis by altering RNA processing, and 3) Identify MYB activated genes functionally critical for tumor growth and amenable to targeting with small molecule therapeutics.

2017-2018 *Broad Institute Cancer Model Development Center*
NCI/ Leidos Biomedical Research Inc.
Co- PI (with Co-PI: Boehm, Total Direct Cost: $385,263)
To address the need for better tools to study cancer, NCI's Office of Cancer Genomics (OCG), Center for Cancer Genomics, together with international institutions, has established a consortium, the Human Cancer Models Initiative (HCMI). The HCMI's goal is to make available to the scientific community large numbers of "next generation" in vitro cancer models that are not encumbered with excessive intellectual property (IP) constraints.

2017 – 2020 Bristol-Myers Squibb Clinical Trial

Bristol-Myers Squibb Company CA209-498
Principal Investigator (Direct Total Costs: $141,241)
The primary goal is to generate central histopathologic review and create reports to provide a standard assessment across all study patients.

2017 – 2020 Bristol-Myers Squibb Clinical Trial
Bristol-Myers Squibb Company CA209-548
Principal Investigator (Direct Total Costs: $105,241)
The primary goal is to generate central histopathologic review and create reports to provide a standard assessment across all study patients.

2017-2022 *Characterizing TP53 and PPM1D mutations as resistance drivers to radiation therapy in Diffuse Intrinsic Pontine Gliomas*
NIH/NCI R01 Beroukhim (PI)
Role: Co-Investigator (Total Direct Cost: $96,077)
The specific aims of this project are to: 1) Define the genomic landscape of DIPG through whole-genome sequencing of patient tumors from the DIPG-BATs trial, 2) Evaluate PPM1D as a resistance driver to radiation therapy in DIPG, and 3) Identify therapeutic approaches to increase sensitivity of PPM1D mutant DIPGs to radiation.

2017-2019 *Single Cell Gene Expression Analysis of Glioblastoma Infiltrating Immune Cell Subsets To Predict Benefit of Immunotherapy Among Newly Diagnosed Glioblastoma Patients*
Ivy Foundation
Role: Principal Investigator ($50,000)
1. Identify single cell gene expression patterns from tumor infiltrating immune cell subsets isolated from tumors collected prior to Ivy NeoVax #2 study therapy that correlate with outcome;
2. Identify single cell gene expression patterns from tumor infiltrating immune cell subsets isolated from tumors collected after progression on Ivy NeoVax #2 study therapy that correlate with acquired resistance.
3. Evaluate additional immunotherapy regimens in preclinical studies based on results obtained from Specific Aims 1 and 2.

2017-2020 *Sponsored Research Agreement*
Deciphera Pharmaceuticals
Principal Investigator (Total Direct Costs: $259,262)
Evaluation of DCC-2618 PDGFRa/KIT inhibitor in various in vitro and in vivo models of gliomas in the laboratory of Professor Ligon and other internal Core Facilities within DFCI. In vitro studies would also include evaluation of the DCC-2618 active metabolite (DP-5439) in selected in vitro assays.

Current Unfunded

2007- DFCI/BWH/BCH Living Tissue Bank

I established and serve as PI for the DFCI/BWH/CHB Living Tissue Bank which creates patient derived cell lines and xenografts (PDCL and PDX) from CNS and other cancers. The Bank serves as a common resource providing preclinical models for investigators at the DFCI/BWH/CHB.

2010- DF/HCC Neuro-Oncology Tissue and Data Bank
I created and serve as PI and director of the DFHCC-wide multi-institutional tissue and data bank which facilitates cross disciplinary Neuro-oncology research across all Harvard hospitals including Brigham and Women's Hospital, Massachusetts General Hospital, Children's Hospital Boston, Dana-Farber Cancer Institute and their affiliates. This protocol and study allow for enrollment of all patients onto a minimal risk, non-therapeutic research clinical trial for prospective study and correlation of research results with clinical results. This represented a major advance for our program due to its use of a single consent form and process across sites that enables wider collaboration.

Projects Submitted for Funding

Pending 2018-2023 Circumventing Barriers to Effective Oncolytic Virotherapy of Malignant Gliomas
NIH/NCI P01
Role: Core Director (Overall PI: Chiocca, direct costs requested - $135,404)
Dr. Ligon will manage the Core C activities for pathology services, new cell line generation and distribution to all P01 projects and investigators to aid study of viral therapy. He will supervise the efforts of the core staff in maintaining and characterizing the new and existing lines using genomics and pathology techniques. He will conduct expert pathological analysis of PDX models to compare the tumors in mice to those of the original patient tumor.

Pending 2018-2023 Phase 1 clinical trial for recurrent glioblastoma with a novel oncolytic virus and cyclophosphamide
NIH/NCI R01 CA245678
Role: Co-I (Overall PI: Chiocca)
Dr. Ligon will direct studies around examination of in vivo effects of oHSV therapeutics on GBM cells within patient samples and mouse models of GBM. Studies will include construction of PDX avatars from clinical trial patients and co-clinical treatment with the same therapy the patient receives to examine effects on immune system, tumor cell death and replication propagation.

Report of Local Teaching and Training

Teaching of Students in Courses

1999-2001	Year 3 & 4 Medical Students 10-hours of lecture per year,	Harvard Medical School Lecturer, Pathology Clerkship
2001	Year 2 Medical Students & Graduate Students, 48-hours of lecture per year	Harvard Medical School Lecturer, Teaching Assistant, Neuroscience (HST 130/ Neurobiology 200)
2001	Graduate Students 3- hour lecture	Harvard Medical School Lecturer, Lecturer, Biological and Biomedical Sciences, Pathology Boot Camp
2001	Year 2 Medical Students & Graduate Students, 48-hours of lecture per year	Harvard Medical School Lecturer, Teaching Assistant, Neuroscience (HST 130/ Neurobiology 200)
2002	Year 2 Medical Students & Graduate Students, 48-hours of lecture per year	Harvard Medical School Lecturer, Teaching Assistant, Neuroscience (HST 130/ Neurobiology 200)
2006	Year 2 Medical Students & Graduate Students, 1-hour lecture	Harvard Medical School Lecturer, Lecturer, Neuroscience (HST 130/ Neurobiology 200)
2018	Graduate Students 2- hour lecture	Harvard Medical School Lecturer, Biological and Biomedical Sciences, Molecular Pathology and Epidemiology of Cancer

Formal Teaching of Residents, Clinical Fellows, and Research Fellows (post-docs)

1999	Supervision and Teaching in Neuropathology Division 10-15 Anatomic pathology Residents and Fellows	Brigham and Women's Hospital 40 hour lecture per year
1999-2001	"Pediatric Neurology and Neuropathology Conference” 10-15 Pediatric Neurology and Neuropathology Residents, Fellows, and Faculty	Boston Children's Hospital 40 hours lecture per year
1999-2001	Adult Neurology and Neuropathology Conference Adult Neurology Residents, Fellows, and Faculty	Brigham and Women's Hospital 40 one hour lecture per year

2002-	"Molecular Pathology of Gliomas"	Boston Children's Hospital
	BWH/CHB Neurosurgery Teaching Conference: 10-30 Neurosurgery Residents	Lecturer, 1 hour lecture 2 hours lecture per year
2004-2005	Neuropathology Teaching Conference	Brigham and Women's Hospital
	Anatomic pathology Residents and Fellows	25 hour lecture per year
2007-2008	Surgical Pathology Update	Brigham and Women's Hospital
	Anatomic pathology Residents and Fellows	1 hour lecture per year
2007-2008	"Neuropathology of Brain Tumors"	Brigham and Women's Hospital
	Anatomic Pathology Teaching Conference: Anatomic Pathology Residents	1 hour lecture per year
2007-2008	Neuro-Oncology Clinical Working Conference (Partners) Lecturer	Brigham and Women's Hospital
	Neurosurgery, Neuroradiology, Neuro-oncology, Neuropathology, and Radiation Therapy Faculty and Staff	2 hour lecture per year
2010	"Neuropathology of Gliomas"	Boston Children's Hospital
	Neurology/ Neuropathology Course: 15-30 Anatomic Pathology Fellows and Residents	Lecturer, 1 hour lecture 1 hour course
2011	"Neuropathology of Gliomas"	Boston Children's Hospital
	Neurology/ Neuropathology Course: 20-35 Anatomic Pathology Fellows and Residents	Lecturer, 1 hour lecture 1 hour course

Clinical Supervisory and Training Responsibilities

2001-	Neuropathology, Clinical Preceptor	Brigham and Women's Hospital 1 hour per week
2001-	Neuropathology, Clinical Preceptor	Boston Children's Hospital 1 hour per week

Laboratory and Other Research Supervisory and Training Responsibilities

2007-	Supervision of Postdoctoral Research Fellows, DFCI	Daily mentorship for 12 months per year
2007-	Supervision of Research, Clinical Fellows, BWH	Daily mentorship for 3 months per year

2008-2009	Supervision of Graduate Students, HMS/DFCI	Daily mentorship for 12 months per year
2011-2013	Supervision of Medical Students, HMS/ DFCI	Daily mentorship for 12 months per year
2016-	Supervision of Medical Students, HMS/DFCI	Daily mentorship for 12 months per year
2017-2018	Supervision of Undergraduate Students, Northeastern University Co-OP Program	Daily mentorship for 6 months per year

Formally Supervised Trainees

2007-2009	Ahmed Idbaih, MD, PhD (Assistant Professor of Medicine, Marie Curie Institute, Paris, France) Supervised as a postdoctoral research fellow in my lab. Published two manuscripts and one as last author in *Clinical Cancer Research*. American Brain Tumor Society Award.
2008-2014	Karl Holmberg Olausson, BA (Student, Karolinska Institute, Stockholm, Sweden) Served as research supervisor during master's degree and co-mentor through Harvard Visiting Fellows Program for Ph.D. research. One first author manuscript in *PLOS ONE*.
2008-2014	Cecile Maire, PhD (Staff Scientist, University of Hamburg, Hamburg, Germany) Mentor – Published nine manuscripts including three first author in *Cancer Discovery*, *Nature Biotechnology*, and *Stem Cells.* Co-author on *Nature Genetics* and *Cancer Cell*.
2008- 2014	Shakti Ramkissoon, MD, PhD (Associate Medical Director, Foundation Medicine, Raleigh, NC) Mentor – Published 12 manuscripts in the lab with two first author in *Nature Medicine* and *Stem Cells* and co-author on manuscripts in *Nature, Cell Stem Cell, Genes and Development*; Mentor for K08 award from NINDS.
2009-	Wenyu Song, PhD (Postdoctoral Fellow) Mentor- First postdoctoral fellowship, two manuscripts in preparation on SOX2 and MYBL1 in gliomas.
2009-2010	Yongji Tian, MD (Assistant Professor of Neurosurgery, Beijing Tian Tian Hospital, Capital Medical University, Beijing, China) Mentor – Visiting neurosurgical fellow from Beijing, China. Published one first author manuscript in *The Journal of Molecular Diagnostics*.
2010-2016	Lori Ramkissoon, PhD (Fellow in Cytogenomics, University of North Carolina, Raleigh, NC) Mentor – Published four manuscripts including two first author in *PNAS* and *Nature Genetics.* American Brain Tumor Society Award.
2011-13	Wenshin Lee, MD (Medical Student/HHMI) Mentor – HMS 3rd year Medical Student performing a research year as HHMI medical student research fellow.

2014-2015	Malak Abedalthagafi, PhD (Assistant Research Professor, King Abdulaziz University for Science and Technology; Director, Saudi Human Genome Lab,King Fahad Medical University) Mentor—Published article in journal *Cancer Genomics and Cytogenetics.*
2015-2016	Frederik De Smet, PhD (Assistant Professor, Translational and Tissue Research, Department of Pathology, Katholieke Universitet Leuven, Flanders, Belgium) Mentor—Co-author on three manuscripts in preparation.
2017-	Anne-Florence Blandin (Post-Doctoral Fellow) Mentor—Visiting postdoctoral fellow from France on a Fulbright Fellowship
2017-	Mahdi Touat (Post-Doctoral Fellow) Mentor—Published first-author article in Annals of Oncology
2018-	Yu Zeng (Post-Doctoral Fellow) Mentor—Visiting postdoctoral Fellow from China
2017-	Juliana Bonardi (Undergraduate Student) Mentor—Northeastern University Co-Op Program

Formal Teaching of Peers

2005-2007	Tumors of the Central Nervous System Harvard Continuing Education	Annual presentation Boston, MA

Local Invited Presentations

2007	"Olig2 Dependency in Neural Stem Cells and Gliomas" DFCI Pediatric Hematology Research Seminar Series	Invited speaker DF/HCCC Boston, MA
2009	"Gliomas, stem cells, and Olig2" DF/ HCC Neuro-Oncology Retreat	Invited speaker UMass Boston, Boston, MA
2010	"Stem Cells, Transcription Factors and Brain Tumors" Partners in Molecular Pathology	Invited speaker BWH/MGH Boston, MA
2011	"Neuropathology of Brain Tumors" DF/ BWCC Neuro-Oncology Program Retreat	Invited speaker DFCI Boston, MA
2014	"Genomics in brain tumor clinical trials" Center for Cancer Genome Discovery Symposium	Invited speaker DFCI Boston, MA
2014	"Pediatric gliomas and MYB family TFs"	Invited speaker

	Brigham and Women's Hospital Pathology Research Conference	BWH, Boston, MA

Report of Regional, National and International Invited Teaching and Presentations
(*Those presentations sponsored by outside entities are so noted and the sponsor is identified)*
Invited Presentations and Courses

Regional

2005	"Diagnostic Neuropathology of Gliomas" Pathology Teaching Conference	Invited Speaker Boston University Medical School, Boston, MA
2008	"Update on Adult Gliomas" Neuroscience Update Series	Invited Lecturer Boston University, Boston, MA
2009	"Transcriptional Control of CNS Cancers" Neuroscience Grand Rounds	Invited Speaker Tufts Medical Center and Floating Hospital for Children, Boston, MA

National

2003	"The Oligodendroglial Lineage Marker Olig2 is universally Expressed in Diffuse Gliomas"/ Platform Presentation, American Association of Neuropathologists Annual School, Orlando, FL
2004	"Olig2 in Development and Disease" Research Seminar Series in Pathology/ Invited Lecture University of Pittsburgh Medical Center, Pittsburgh, PA
2005	"Olig2 function is required for NG2 cell Development"/ Platform Presentation American Association of Neuropathologists Annual Meeting, Arlington, VA
2005	"Olig function in glial development and Gliomas"/ Research Seminar/ Lecture University of Virginia Medical Center, Charlottesville, VA
2005	"Transcription factor regulation of glial development and gliomas"/ Invited Lecture, Research Seminar Series University of Washington Medical School, St. Louis, MO
2005	"Olig genes in Development and Gliomagenesis"/ Invited Lecture Mouse Models of Human Cancer NIH/NCI Symposium, Orlando, FL
2005	"Transcription factor insights into glioma development"/ Invited Speaker Department of Pathology, Univ. of California, San Diego, CA
2005	"Comparative analysis of stem cell transcription factors in CNS germ cell tumor reveals diagnostic utility of NANOG"/ Platform Presentation International Brain Tumor Research and Therapy Meeting, Napa, CA

2005 "Neural stem and progenitor cell insights into gliomas: Novel origins, markers and therapeutic targets"/ Invited Speaker
Matthew T. Moore Distinguished Lecture in Neuropathology, International Congress of Neuropathology, San Francisco, CA

2005 "Alternative cells of origin in gliomas"/ Invited Speaker, Education Day
Society for Neuro-Oncology Annual Meeting, Chicago, IL

2005 "Novel cellular origins of medulloblastoma from stem/progenitor cells of the cerebellum"/ Invited Speaker
American Association of Neuropathologists (AANP) Annual Meeting, Cleveland, OH

2006 "Transcription factor insights into glioma development"/ Invited Speaker
Institute of Regeneration Medicine, Univ. of California San Francisco, San Francisco, CA

2008 "Cancer Stem Cells in Brain Tumors"/ Moderator
Annual Meeting Moderator, Neuro-Oncology Stem Cell Biology Section American Society of Clinical Oncology (ASCO)

2008 "Stem/Progenitor cell transcription factors in CNS cancers"/ Invited Speaker
Genentech, San Francisco, CA (sponsor: Genentech)

2010 "Update on PLGA Pathology and Diagnostics"/ Invited Speaker
Pediatric Low Grade Astrocytoma Foundation, Boston, MA

2010 "SOX2 in GBM"/ Invited Speaker
Sontag Annual Distinguished Scholars Meeting, White Oak, FL

2010 "Cancer Stem Cells and Neural Stem Cells"/ Invited
Society for Neuro-Oncology Annual Meeting, New Orleans, LA

2011 "Neuropathology Update"/ Invited Speaker, Neuropathology Steering Committee
Ivy Foundation Early Stage Clinical Trials Consortium, Boston, MA

2011 "SOX2 in GBM"/ Invited Speaker
Sontag Annual Retreat, Jacksonville, FL

2011 "Molecular Pathology and Clinical Trials Integration"/ Invited Speaker/ Organizer
Sunrise Session: Meet the Experts,
Society for Neuro-Oncology Annual Meeting, Anaheim, CA

2011 "Establishing Pathological Response Criteria in Neuro-Oncology (PRANO)"/ Invited Speaker
Adult Brain Tumor Consortium (ABTC) Annual Meeting, Baltimore, MD

2012 "Molecular pathology technology integration with clinical trials in Glioblastoma"/ Invited Speaker
Alliance Clinical Trials Consortium Winter Meeting: Correlation Sciences in Neuro-Oncology, Chicago, IL

2012 "Synoptic Reporting in Neuropathology"/ Invited Guest Speaker
CAP Neuropathology Section Annual Meeting, Bar Harbor, ME

2012 "Novel genomic aberrations in pediatric low grade gliomas"/ Invited Speaker
COG Fall Group Meeting, Atlanta, GA

2014 "Novel Transcription Factors in PLGAs”/ Invited Speaker
Pediatric Low Grade Astrocytoma Foundation, Boston, MA

2014 "Transcription Factor Regulation of Gliomagenesis”/ Invited Speaker

Johns Hopkins Molecular Medicine Series, Baltimore, MD

2014 "Novel Diagnostics Incorporated into Adaptive Trials"/ Invited Speaker
Alliance Clinical Trials Consortium Meeting, Neuro-oncology Section, Chicago, IL

2014 "Measuring Single Cell Growth in GBM"/ Invited Speaker
National Cancer Institute Science Day, Bethesda, MD

2015 Society for Neurooncology Education Day/ Chair
SNO Annual Meeting, San Antonio, TX

2015 "MYB Transcription Factors in Pediatric Gliomas"/ Invited presentation
ASIP, Boston, MA

2016 "MYB Factors in Gliomas"/ Invited Lecture
Annual Retreat of the Sontag Distinguished Scientist Community, Palm Springs, CA

2016 "MYB Transcription Factors in Gliomas"/ Invited Lecture
Henry Ford Cancer Institute, Detroit, MI

2016 "Mock Integrative Diagnostic Tumor Board"/ Session Moderator and Invited Lecture
Society for Neurooncology Annual Meeting, Phoenix, AZ

2017 "Update on Single Cell Mass Biomarkers in Cancer"/ Invited Lecture
HCMI Broad-DFCI Cancer Model Derivation Center Kickoff Meeting, Washington, DC

2017 "Precision Medicine for Pediatric Neuro-Oncology"/ Sunrise Session
Society for Neurooncology Pediatric Meeting, New York, NY

2017 "Human cancer models of glioma"/ Invited Seminar
Memorial Sloan Kettering Cancer Center Brain Tumor Program Meeting, New York, NY

2017 Single Cell Technologies in Brain Tumors/Session Moderator
Society for Neurooncology 22nd Annual Meeting, San Francisco, CA

2017 "Single Cell Mass as a Novel Biomarker of Drug Response in Brain Tumors"/ Invited Lecture,
Society for Neurooncology 22nd Annual Meeting, San Francisco, CA

2018 "Strategies for Clinical Data Collection on Patient Derived Cell Lines",
NCI-HCMI Cancer Model Derivation Center Meeting, Washington, DC

2018 "Creation of Patient Derived Cancer Models at Scale Leverages Patient Diversity for Improved Clinical Trials Predictions"/ Invited Co-presentation (Co-presenter Kin-Hoe Chow, PhD)
World Preclinical Congress, Boston, MA

International

2009 "SOX2 in glioblastoma stem cells"/ Invited Speaker
Association of Neurology Society, Montreal, Quebec

2010 "SOX2 in GBM"/ Invited Speaker
Association of Neurology Society, Paris, France

2010 "Glioma Molecular Pathology"/ Invited Lecturer
Paris Hospital Saltpetriere, Paris, France

2011 "Stem Cells and Brain Tumors"/ Invited Speaker

Paris Hospital Saltpetriere, Paris, France

2012 "Personalizing pathology of brain tumors"/ Invited Speaker
Hospital for Sick Children, Toronto, ON, Canada

2012 "Stem cell transcription factors in brain tumors"/ Invited Speaker
Hospital for Sick Children, Toronto, ON, Canada

2013 "SOX2 in GBM"/ Invited Speaker
Sontag Foundation Annual Meeting, Caneel Bay, US Virgin Islands

2014 "Single Cell Sequencing of GBM"/ Invited Speaker
NeuroWoche Meeting, Munich, Germany

2015 "MYB transcription factors in pediatric glioma"/ Invited Speaker,
Karolinska Institute, Stockholm, Sweden

2016 "MYB transcription factor family in gliomas"/ Invited Speaker, European Congress of Neuropathology

Report of Clinical Activities and Innovations

Current Licensure and Certification

1998-	American Board of Medical Examiners
2000-	Commonwealth of Massachusetts Board of Registration in Medicine, full-medical license
2001-	American Board of Pathology (Combined Anatomic Pathology/ Neuropathology)

Practice Activities

2001-	Surgical Pathology Neuropathology	Brigham and Women's and Boston Children's Hospitals	10 weeks per year
2001-	Autopsy Pathology Neuropathology	Brigham and Women's and Boston Children's Hospitals	5 weeks per year
2012-	Molecular Pathology Neuropathology	Brigham and Women's Hospital	1 session per week

My clinical activities are 20% of my effort and include Surgical Pathology, Frozen Section Pathology, Autopsy Pathology, and Cytogenetic/Molecular Diagnostic sign-out of Neuropathology cases. I perform all these duties at Brigham and Women's Hospital and Surgical Pathology and Autopsy Pathology at the BCH.

Clinical Innovations

Diagnostic Immunohistochemical Markers of Brain Tumors (2002-present):

- I identified and implemented a number of immunohistochemical biomarkers for clinical testing including the transcription factors OLIG2, SOX2, and CRX. These markers discovered in my basic research studies to be specific for neural cell types were also found to be specific for certain types of brain tumors which in some cases had no known markers for identification. These tests are now routinely used clinically within the DF/BWCC and throughout the world to improve identification and specificity of diagnosis of glioblastoma and other tumors.

Diagnostic CISH/FISH Testing for Brain Tumors (2010):

- In collaboration with the Neuropathology and Cytogenetics divisions I developed and validated several clinical tests for targeted copy number analysis of adult and pediatric brain tumor patients including 1p/19q co-deletion, EGFR amplification, and BRAF duplication assays. These tests allowed provide critical diagnostic and prognostic information for patient care. In addition, these tests are used for patient eligibility for therapeutic clinical trials in oncology.

Whole-Genome Array CGH Diagnostic Testing (2012):

- In collaboration with Drs. Neal Lindeman and Azra Ligon, of the BWH Center for Advanced Molecular Diagnostics, I worked to develop, validate and implement one of the first clinically billable whole genome diagnostic tests available for cancer patients on FFPE samples. This service approach is now being implemented at other sites nationally and internationally. The CLIA certified lab at the BWH is being considered for use as a central testing site for array CGH in clinical trials of brain tumor patients in 2014 through multiple NCI funded clinical trials consortia (Alliance and Children's Oncology Group).

Integrative Diagnostic Oncology Service (2013):

- In collaboration with the Cytogenetics Division of the BWH, I developed a new clinical service and conference series for diagnostic signout of adult brain tumor cases. Review of the Pathology, whole genome array CGH and Molecular Diagnostic results are done jointly by Neuropathology and Cytogenetics faculty to improve diagnosis and prognostic information delivered to patients and is included in patient clinical reports.

ABC2 Allele GBM Consortium (2017- present):

- In collaboration with the Cytogenetics Division of the BWH and the Broad Clinical Research Sequencing Platform I developed a research study to offer whole exome sequencing and whole genome array copy testing and designed novel software interface (designed with Sypase Inc.) for integrative pathology reporting and ordering. The program seeks to provide data within 3 weeks of surgery for newly diagnosed GBM patients. The goal of the program is to provide deep genomic data

for patient enrollment to complex clinical trials and use of same data in analysis of trial results, while being independent of trials restrictions. This program provides clinical reports in the medical records for patient and physician use for diagnosis and prognosis as well as it is performed in a CLIA laboratory. The study was funded by the ABC2 Foundation.

Report of Technological and Other Scientific Innovations

Methods for Generating Nucleic Acid Molecular Fragments Having a Customized Size Distribution. US Patent Application, 61/788,006, filed March 15, 2013.

This patent is for methods used to improve DNA performance in array CGH, sequencing, and other assays that examine DNA at certain fragment lengths for research and clinical diagnostic purposes. This method enabled the implementation of array CGH into a clinical laboratory test now performed routinely at the BWH. Filing was performed by the Dana-Farber Cancer Institute based on work performed in my lab. Inventors include myself, Dr. Azra Ligon and Justin Craig.

Report of Scholarship

Peer-Reviewed Publications

Research Investigations

1. Aka K, Bruner JM, Bondy ML, **Ligon K**, Nishi T, del Giglio A, Moser RP, Levin VA, Saya H. Detection of p53 alterations in human astrocytomas using frozen tissue sections for the polymerase chain reaction. Neuro-Oncology. 1993;16(2):125-133.

2. Miano JM, Cserjesi P, **Ligon KL**, Periasamy M, Olson EN. Smooth muscle myosin heavy chain exclusively marks the smooth muscle lineage during mouse embryogenesis. Circ Res. 1994;75(5):803-812.

3. Burgess R, Cserjesi P, **Ligon KL**, Olson EN. Paraxis: A basic helix-loop-helix protein expressed in paraxial mesoderm and developing somites. Dev Biol. 1995;168(2):296-306.

4. Cserjesi P, Brown D, **Ligon KL**, Lyons GE, Copeland NG, Gilbert DJ, Jenkins NA, Olson EN. Scleraxis: A basic helix-loop-helix protein that prefigures skeletal formation during mouse embryogenesis. Development (Cambridge, England). 1995;121(4):1099-1110.

5. Black BL, **Ligon KL**, Zhang Y, Olson EN. Cooperative transcriptional activation by the neurogenic basic helix-loop-helix protein MASH1 and members of the myocyte enhancer factor-2 (MEF2) family. Biol Chem. 1996;271(43):26659-26663.

6. Bachoo RM, Maher EA, **Ligon KL**, Sharpless NE, Chan SS, You MJ, Tang Y, DeFrances J, Stover E, Weissleder R, Rowitch DH, Louis DN, DePinho RA. Epidermal growth factor receptor and Ink4a/Arf: convergent mechanisms governing terminal differentiation and transformation along the neural stem cell to astrocyte axis. Cancer Cell. 2002;1(3):269-277.

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8. Picker JD, Puga AC, Levy HL, Marsden D, Shih VE, Degirolami U, **Ligon KL**, Cederbaum SD, Kern RM, Cox GF. Arginase deficiency with lethal neonatal expression: Evidence for the glutamine hypothesis of cerebral edema. Pediatrics. 2003;142(3):349-352.

9. Bachoo RM, Kim RS, **Ligon KL**, Maher EA, Brennan C, Billings N, Chan S, Li C, Rowitch DH, Wong WH, DePinho RA. Molecular diversity of astrocytes with implications for neurological disorders. Proc Nat Acad Sci (USA). 2004;101(22):8384-8389.

10. **Ligon KL**, Alberta JA, Kho AT, Weiss J, Kwaan MR, Nutt CL, Louis DN, Stiles CD, Rowitch DH. The oligodendroglial lineage marker OLIG2 is universally expressed in diffuse gliomas. J Neuropathol Exp Neurol. 2004;63(5):499-509.

11. Dong S, Nutt CL, Betensky RA, Stemmer-Rachamimov AO, Denko NC, **Ligon KL**, Rowitch DH, Louis DN. Histology-based expression profiling yields novel prognostic markers in human glioblastoma. J Neuropathol Exp Neurol. 2005;64(11):948-955.

12. Gaviani P, Schwartz RB, Hedley-Whyte ET, **Ligon KL**, Robicsek A, Schaefer P, Henson JW. Diffusion-weighted imaging of fungal cerebral infection. Am Neuroradiol. 2005;26(5):1115-1121.

13. Krishnamurthy J, Ramsey MR, **Ligon KL**, Torrice C, Koh A, Bonner-Weir S, Sharpless NE. p16INK4a induces an age-dependent decline in islet regenerative potential. Nature. 2006;443(7110):453-457.

14. **Ligon KL**, Kesari S, Kitada M, Sun T, Arnett HA, Alberta JA, Anderson DJ, Stiles CD, Rowitch DH. Development of NG2 neural progenitor cells requires Olig gene function. Proc Nat Acad Sci (USA). 2006;103(20):7853-7858.

15. Maher EA, Brennan C, Wen PY, Durso L, **Ligon KL**, Richardson A, Khatry D, Feng B, Sinha R, Louis DN, Quackenbush J, Black PM, Chin L, DePinho RA. Marked genomic differences characterize primary and secondary glioblastoma subtypes and identify two distinct molecular and clinical secondary glioblastoma entities. Cancer Res. 2006;66(23):11502-11513.

16. Mao J, **Ligon KL**, Rakhlin EY, Thayer SP, Bronson RT, Rowitch D, McMahon AP. A novel somatic mouse model to survey tumorigenic potential applied to the Hedgehog pathway. Cancer Res. 2006;66(20):10171-10178.

17. Rousseau A, Nutt CL, Betensky RA, Iafrate AJ, Han M, **Ligon KL**, Rowitch DH, Louis DN. Expression of oligodendroglial and astrocytic lineage markers in diffuse gliomas: use of YKL-40, ApoE, ASCL1, and NKX2-2. Neuropathol Exp Neurol. 2006;65(12):1149-1156.

18. Santagata S, Hornick JL, **Ligon KL**. Comparative analysis of germ cell transcription factors in CNS germinoma reveals diagnostic utility of NANOG. Am J Surg Pathol. 2006;30(12):1613-1618.

19. Sun T, Hafler BP, Kaing S, Kitada M, **Ligon KL**, Widlund HR, Yuk D-I, Stiles CD, Rowitch DH. Evidence for motoneuron lineage-specific regulation of Olig2 in the vertebrate neural tube. Dev Biol. 2006;292(1):152-164.

20. Byers RJ, Di Vizio D, O'Connell F, Tholouli E, Levenson RM, Gossage K, Gossard K, Twomey D, Yang Y, Benedettini E, Rose J, **Ligon KL**, Finn SP, Golub TR, Loda M. Semiautomated multiplexed quantum dot-based *in situ* hybridization and spectral deconvolution. Molec Diag. 2007;9(1):20-29.

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22. **Ligon KL***, Huillard E*, Mehta S*, Kesari S, Liu H, Alberta JA, Bachoo RM, Kane M, Louis DN, DePinho RA, Anderson DJ, Stiles CD, Rowitch DH. Olig2-regulated lineage-restricted pathway controls replication competence in neural stem cells and malignant glioma. Neuron. 2007;53(4):503-517.

23. Monje ML, Vogel H, Masek M, **Ligon KL**, Fisher PG, Palmer TD. Impaired human hippocampal neurogenesis after treatment for central nervous system malignancies. Ann Neurol. 2007;62(5):515-520.

24. Ramsey MR, Krishnamurthy J, Pei X-H, Torrice C, Lin W, Carrasco DR, **Ligon KL**, Xiong Y, Sharpless NE. Expression of p16Ink4a compensates for p18Ink4c loss in cyclin-dependent kinase 4/6-dependent tumors and tissues. Cancer Res. 2007;67(10):4732-4741.

25. Santagata S, **Ligon KL**, Hornick JL. Embryonic stem cell transcription factor signatures in the diagnosis of primary and metastatic germ cell tumors. Am J Surg Pathol. 2007;31(6):836-845.

26. Stommel JM, Kimmelman AC, Ying H, Nabioullin R, Ponugoti AH, Wiedemeyer R, Stegh AH, Bradner JE, **Ligon KL**, Brennan C, Chin L, DePinho RA. Coactivation of receptor tyrosine kinases affects the response of tumor cells to targeted therapies. Science (New York, NY). 2007;318(5848):287-290.

27. Agarwalla PK, Dunn IF, Turner CD, **Ligon KL**, Schneider KA, Smith ER. A novel TP53 germline mutation in a family with a history of multiple malignancies: Case report and review of the literature. Ped Neurosurg. 2008;44(6):501-508.

28. Billiards SS, Haynes RL, Folkerth RD, Borenstein NS, Trachtenberg FL, Rowitch DH, **Ligon KL**, Volpe JJ, Kinney HC. Myelin abnormalities without oligodendrocyte loss in periventricular leukomalacia. Brain Pathol. (Zurich, Switzerland). 2008;18(2):153-163.

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neoplastic stem cells in glioblastoma. Cold Spring Harbor Symp Quantitat Biol. 2008;73:427-437.

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Muzikansky A, Weiss SE, Wen PY. Phase I study of vandetanib with radiotherapy and temozolomide for newly diagnosed glioblastoma. Int J Radiat Oncol, Biol, Phys. 2010;78(1):85-90.

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Scholarships without named authorship

1. Roadmap Epigenomics Consortium*., Kundaje A, Meuleman W, Ernst J, Bilenky M, Yen A, Heravi-Moussavi A, Kheradpour P, Zhang Z, Wang J, Ziller MJ, Amin V, Whitaker JW, Schultz MD, Ward LD, Sarkar A, Quon G, Sandstrom RS, Eaton ML, Wu YC, Pfenning AR, Wang X, Claussnitzer M, Liu Y, Coarfa C, Harris RA, Shoresh N, Epstein CB, Gjoneska E, Leung D, Xie W, Hawkins RD, Lister R, Hong C, Gascard P, Mungall AJ, Moore R, Chuah

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(*One of the Analysis and Production Contributors cited in the footnotes of the manuscript)

Books/ Textbooks for the Medical or Scientific Community

1. Monuki ES, **Ligon KL**. Cerebral Heterotopia. In: Golden, JA, editor. Pathology and Genetics: Pediatric Neuropathology, ISN Neuropathology Press, 2004.

2. **Ligon K**L, Mokhtari K, Smith, TW. Tumors of the Central Nervous System. In: De Girolami, U, Gray, F, Dyckaerts, C, editors. Escourolle and Poirier's Manual of Basic Neuropathology 2013.

3. Monuki ES, **Ligon KL**. Cerebral Heterotopia. In: Golden, JA, editor. Pathology and Genetics: Pediatric Neuropathology, ISN Neuropathology Press, *in press*

4. **Ligon KL**, Sanatagata S, Biele, F,. Tumors of the Central Nervous System. In: De Girolami, U, Gray, F, Dyckaerts, C, editors. Escourolle and Poirier's Manual of Basic Neuropathology *in press.*

Narrative Report (limit to 500 words)

I am a physician-scientist with expertise in Neuropathology and Oncology. My research and clinical activities are focused on improving the diagnosis and treatment of brain tumors. My academic effort is currently distributed as 60% research, 20% clinical service and 20% administrative activities within Neuropathology. Collectively my achievements in these areas have significantly improved our scientific understanding of brain tumors and medical care for brain tumor patients.

My area of excellence is investigation. Over several years my lab has elucidated the function of developmental transcription factors in cancer and developed novel methods for clinical genomics of cancer. My early work identified roles for OLIG2 in glioma (Ligon et al. Neuron 2007), medulloblastoma (Cancer Cell 2008) and normal neural stem cells (Stem Cells, 2013). More recently we have used genomics to identify MYB family transcription factors as novel fusion oncogenes in pediatric low grade gliomas (PNAS 2013, Nature Genetics 2016), report novel mutations in ACVR1 and FGFR1 in pediatric high grade gliomas (Nat. Gen. 2014), and developed new single cell sequencing methods to study EGFR variant diversity in glioblastoma (Cancer Discovery 2014) and novel drug response biomarkers (Nature Biotech 2017). In other research my lab has developed methods for genomic analysis of clinical specimens, the most noteworthy of which is the fragmentation simulation method (FSM) that enabled whole genome array CGH to be performed on FFPE clinical tumor samples (PLOS ONE 2012) and led to development of a patent. In addition, we discovered several novel brain tumor lineage transcription factors (OLIG2, SOX2, CRX, MYB) and created diagnostic FISH and PCR markers of known genomic aberrations (BRAF duplication/fusion, MYBL1 duplication/fusion).

In the areas of teaching and education, I have been directly involved in the training of medical and graduate students, postdoctoral fellows, residents, and faculty. My teaching includes lectures and labs on neuroanatomy to medical and graduate students (HST 130/Neurobiology 200), and lectures to BBS graduate students on topic of brain tumor pathology in the Pathology Boot Camp at the Harvard Medical School. One of the most rewarding aspects of my teaching career has been mentoring junior physician-scientists for two K08 awardees (mentor for Dr. Shakti Ramkissoon, MD, PhD, Neuropathology Fellow, and co-mentor for Dr. Soma Sengupta MD PhD a Neuro-oncology Fellow) and a Howard Hughes Medical Student Research Fellow (Dr. Wen-shin Lee, HMS currently a resident in Ophthalmology at UCSF).

Finally, a significant supporting activity in my career is clinical expertise. In Neuropathology with a specialization in brain tumors. Several of the methods I have developed in my research I have helped to implement in the clinical lab to improve patient diagnosis including the first clinical whole genome solid tumor copy number assay for FFPE samples and novel immunohistochemical markers of tumors. Furthermore, I have led efforts to train Neuropathologists in utilization of genomic tests in practice and led genomically informed clinical trials development at the local and national consortium level (e.g. Alliance and COG).