

## Curriculum Vitae

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**Place of Birth:** Tainan, Taiwan

### Education

1992	B.S. (with honors and departmental distinction)	Biological Sciences	Stanford University
1993	M.S.	Epidemiology	Columbia University
1999	Ph.D.	Genetics (Richard Kolodner, Ph.D.)	Harvard Medical School
2001	M.D.	Medicine	Harvard Medical School

### Postdoctoral Training

2001-2	Intern	Department of Surgery	Massachusetts General Hospital
2002-7	Resident	Department of Neurosurgery	Massachusetts General Hospital
2004-6	Post-doctoral fellow	Department of Radiation Oncology, (Laboratory of Alan D'Andrea, M.D.)	Dana Farber Cancer Institute
2005-6	Clinical fellow	Radiosurgery, Department of Radiation Oncology	Massachusetts General Hospital
2008-9	Clinical fellow	Stereotactic Neurosurgery, Division of Neurosurgery	Beth Israel Deaconess Medical Center

**Licensure and Certification**

2001-2011	Massachusetts Medical License Registration
2011-2017	California Medical License Registration
2017-	Minnesota Medical License Registration
2012-	American Board of Neurological Surgeons (Board certified, November 2012)

**Faculty Academic Appointments**

2007-8	Instructor	Department of Neurosurgery	Massachusetts General Hospital
2008-9	Instructor	Department of Surgery	Beth Israel Deaconess Medical Center
2008-9	Instructor	Department of Radiation Oncology	Dana Farber Cancer Institute
2009-11	Asst. Professor	Department of Surgery	Beth Israel Deaconess Medical Center
2009-11	Asst. Professor	Department of Radiation Oncology	Dana Farber Cancer Institute
2011-12	Asst. Professor	Department of Surgery	University of California, San Diego
2013-17	Associate Professor	Department of Surgery	University of California, San Diego
2017	Professor	Department of Surgery	University of California, San Diego
2017	Professor	Department of Radiation Oncology	University of California, San Diego
2017	Professor and Chair	Department of Neurosurgery	University of Minnesota

**Appointments at Hospitals/Affiliated Institutions**

2007-8	Attending Neurosurgeon	Department of Neurosurgery	Massachusetts General Hospital
2008-11	Attending Neurosurgeon	Division of Neurosurgery, Department of Surgery	Beth Israel Deaconess Medical Center
2011-	Attending Neurosurgeon	Division of Neurosurgery, Department of Surgery	University of California, San Diego
2012-	Attending Neurosurgeon	Division of Neurosurgery, Department of Surgery	Scripps Clinic
2013-	Attending Neurosurgeon	Department of Surgery	Palomar Hospital
2017-	Attending Neurosurgeon	Department of Neurosurgery	University of Minnesota Medical Center

**Other Professional Positions**

2008-11	Scientific Advisory Board	International Brain Mapping and Intraoperative Surgical Planning Society
2010-11	Board of Directors	International Brain Mapping and

2011-	Senior Advisory Board	Intraoperative Surgical Planning Society Society of Brain Mapping and Therapeutics
2012-	Scientific Advisory Board	In Tech Publishing
2013	Co-Chairman, Preuss Symposium Organizing Committee	The Preuss Foundation
2013	Co-Chairman, 2013 Annual Biomedical Engineering Conference Organizing Committee	San Diego Chinese American Science and Engineering Association
2013	Faculty, Guidelines for the Treatment of Cerebral Metastasis	Congress of Neurological Surgeons
2013	Faculty, Goodman Oral Board Review Course	American Association of Neurological Surgeons
2013	Faculty, Difficult Cases in CNS	American Society for Radiation Oncology
2013	Faculty, Innovation and Technology Symposia	Congress of Neurological Surgeons
2014	Chairman, 2013 Extracellular Vesicle Forum Organizing Committee	Forbeck Foundation
2015	Course Director, 2015, Laser thermal ablation: Principles, Practice, and Pitfalls	Monteris Medical
2015	Consultant	Monteris Medical
2015	Consultant	MRI Intervention
2015	Advisory Committee	Massachusetts General Hospital K12 Training Grant
2015	Faculty, Congress of Neurological Surgeon Webinar for Oral Board Review	Congress of Neurological Surgeons

### Major Administrative Leadership Positions

2007-8	Director, North Neurosurgery Service	Massachusetts General Hospital
2008-11	Director, Clinical Neuro-Oncology	Beth Israel Deaconess Medical Center
2008-11	Neuro-Oncology Seminar Series (monthly seminars for medical oncology/neurology residents)	Beth Israel Deaconess Medical Center
2009-11	Course director, Neurosurgery clerkship (SU509M.5)	Beth Israel Deaconess Medical Center
2009-11	Course director, Evidence based neurosurgery clerkship (SU524M.5)	Beth Israel Deaconess Medical Center
2009-11	Course director, Neurosurgical Oncology (SU515M.5)	Beth Israel Deaconess Medical Center
2009-11	Director, Medical Education	Beth Israel Deaconess Medical Center
2009-11	Faculty Advisor, Cushing Neurosurgical Society	Division of Neurosurgery Harvard Medical School
2010-11	Fellow, The Academy at Harvard Medical School	Harvard Medical School
2010-11	Fellow, The Academy of Medical Educators at the Beth Israel Deaconess Medical Center	Beth Israel Deaconess Medical Center
2011-13	Director of Stereotactic and Radiosurgery	University of California, San Diego

2011-15	Director, Introduction to Neurosurgery (Surg-401A)	University of California, San Diego
2012-17	Course director, Introduction to Neurosurgery (Surg-410)	University of California, San Diego
2011-17	Co-Director, Surgical Neuro-Oncology	University of California, San Diego
2011-17	Neurosurgery Clerkship Director	University of California, San Diego
2011-17	Neurosurgery Sub-Internship Director	University of California, San Diego
2012-17	Director of Medical Education	University of California, San Diego
2012-17	Course director, Neurological Surgery (Surg-454)	University of California, San Diego
2013-17	Vice Chairman, Research and Academic Development, Division of Neurosurgery	University of California, San Diego
2013-17	Chief, Stereotactic and Radiosurgery	University of California, San Diego
2014-17	Course director, Introduction to Neurosurgery (NEU224)	University of California, San Diego
2014-17	Academic Senate Representative	University of California, San Diego
2014-17	Coordinator of Neurosurgery Didactics for General Surgery Residents	University of California, San Diego
2015-17	Course director, Clinical Practice of Neurosurgery, (NEU226)	University of California, San Diego
2017-	Clinical Sciences Council	University of Minnesota
2017-	Graduate Medical Education Council	University of Minnesota
2017-	Council of Surgical Chairs	University of Minnesota
2017-	Institute of Translational Neuroscience Steering Committee	University of Minnesota
2017-	MnDRIVE Brain Conditions Steering Committee Meeting	University of Minnesota
2017-	Medical Executive Council	University of Minnesota
2017-	Department Heads Council	University of Minnesota

**Committee Service**

2007-8	Trauma Chief Search Committee Member	Massachusetts General Hospital
2008-11	Radiation Oncology CNS Chief Search Committee Member	Brigham and Women's Hospital
2008-11	Organ Donation Council Member	Beth Israel Deaconess Medical Center
2010-11	Cancer Biology Professor Search Committee Member	Beth Israel Deaconess Medical Center
2010-11	Affinity Research Collaborative Committee Member	Beth Israel Deaconess Medical Center
2010-11	Department of Surgery Performance Committee	Beth Israel Deaconess Medical Center
2011	Education Coordinator Search Committee Member	University of California, San Diego
2012-15	Research Day Planning Committee Member	University of California, San Diego
2012-15	Surgery Research Committee	University of California, San Diego
2012-17	Recruitment and Admissions Committee	University of California, San Diego
2012	Ph.D. Thesis Committee, Wen Qiao	University of California, San Diego
2012	Diversity Community, Division of Neurosurgery	University of California, San Diego

2013	Tissue Distribution Committee, Brain Tumor Collaborative Group, Moores Cancer Center	University of California, San Diego
2013	IRB Committee, Brain Tumor Collaborative Group, Moores Cancer Center	University of California, San Diego
2013	Committee on Departmental Culture, Department of Surgery	University of California, San Diego
2013	Committee on Rewards and Recognition, Department of Surgery	University of California, San Diego
2014	Surgery Department Representative to the Senate Assembly	University of California, San Diego
2014	Neurological Council Workgroup	University of California, San Diego
2015	Committee on Academic Freedom	University of California, San Diego
2015	Committee on Minor Proposition	University of California, San Diego
2015	Committee on Recruitment of Pediatric Neurosurgery	University of California, San Diego
2015	Senate Examination Committee, Tony Yen	University of California, San Diego
2015	Director of Neuro-oncology, Search Committee	University of California, San Diego
2016	Head of Neuro-pathology, Search Committee	University of California, San Diego
2016	Thesis Examination Committee, Wei Cai	University of California, San Diego
2017	Thesis Examination Committee, Tony Yan	University of California, San Diego
2017	Reviewer, Study Section, NCI Program Project grant (05 ZCA1 RPRB-6)	National Institutes of Health
2017	Reviewer, Study Section, Cancer Drug Development & Therapeutics (2018/01 ZRG1 OTC-T (10) B	National Institutes of Health

### Professional Societies

2001-	American Association of Neurological Surgeons (AANS)
2013-	Faculty, Annual Meeting
2001-	Congress of Neurological Surgeons (CNS)
2013-	Faculty, Annual Meeting
2001-	Joint Section for Tumors, AANS and CNS
2013-	Executive committee
2004-	American Association for Cancer Research
2004-	American Association for the Advancement of Science
2006-	Society of Neuro-Oncology
2008 –	Abstract Selection Committee
2012 –	Abstract Selection Committee
2009-	International Brain Mapping and Intraoperative Surgical Planning Society
2009-	Member, Publication Committee
2009-	Member, CME Committee
2010-	Board of Directors
2011-	Co-chair, Publicity Committee
2012-	Member, Advisory Committee
2011-	San Diego Academy of Neurosurgery
2013-	Gliomas, Advisory Board Member

- 2013-4 Faculty, American Society for Radiation Oncology  
 2013 Committee Co-Chair, Preuss Symposium Planning Committee, Preuss Foundation  
 2014- Session Chair, International Society for Extracellular Vesicles (ISEV)  
 2014- Executive Committee, American Association of Neurological Surgeon and Congress of Neurological Surgeons Tumor Section  
 2015 Scientific Review Committee, American Cancer Society  
 2015 Scientific Review Committee, International Stereotactic Radiosurgery Society Congress  
 2015 Scientific Review Committee, Society of Neuro-Oncology 2015 Annual Meeting  
 2015 Scientific Advisory Board, Tocagen  
 2015 Advisory Board, Massachusetts General Hospital K12 training grant  
 2016 Faculty, Oral Board Review, Neuro-Oncology, Congress of Neurological Surgeons  
 2016 Advisory Board, Southeastern Brain Tumor Foundation  
 2016 Vice-Chair of the International Committee, Joint Section on Tumors of the American Association of Neurological Surgeons and the Congress of Neurological Surgeons

### Editorial Activities

- 2004- Reviewer *Molecular and Cellular Biology*  
 2004- Reviewer *Molecular Cancer Therapeutics*  
 2007- Reviewer *Cancer Research*  
 2007- Reviewer *Journal of Neuro-Oncology*  
 2007- Reviewer *Journal of Neurology*  
 2007- Reviewer *Journal of Neurology, Neurosurgery, and Psychiatry*  
 2008- Reviewer *Cancer Epidemiology, Biomarkers & Prevention*  
 2008- Reviewer *Clinical Cancer Research*  
 2009- Reviewer *Cell Proliferation*  
 2009- Reviewer *Journal of Neuroimmunology*  
 2009- Reviewer *Proceedings of the National Academy of Sciences*  
 2010- Reviewer *Medical Principles and Practices*  
 2010- Reviewer *Cold Spring Harbor Protocols*  
 2010- Reviewer *Molecular and Cellular Biochemistry*  
 2011- Reviewer *Journal of Neurological Sciences*  
 2011- Reviewer *New England Journal of Medicine (CPC case conference)*  
 2011- Reviewer *Anti-Cancer Agents in Medicinal Chemistry*  
 2011- Reviewer *Neuroimage*  
 2011- Reviewer *Neurosurgery*  
 2011- Reviewer *Journal of Health Care Engineering*  
 2011- Reviewer *Journal of Neuroimmune Pharmacology*  
 2011- Reviewer *Proceedings of National Academy of Sciences*  
 2012- Reviewer *Cancers*  
 2012- Reviewer *Journal of Pediatric Neurology*  
 2012- Reviewer *Radiotherapy & Oncology*  
 2012- Reviewer *PLoS Genetics*  
 2012- Reviewer *Cancer Discovery*  
 2013- Reviewer *Clinical Neurology and Neurosurgery*  
 2013- Reviewer *Neuro-Oncology*  
 2013- Reviewer *Radiation and Environmental Biophysics*

2013-	Reviewer	<i>British Journal of Medicine and Medical Research</i>
2013-	Reviewer	<i>Journal of Neurosciences in Rural Practice</i>
2013-	Reviewer	<i>Molecular Cancer Research</i>
2013-	Reviewer	<i>World Journal of Surgical Oncology</i>
2013-	Reviewer	<i>PloSOne</i>
2013-	Reviewer	<i>Technology in Cancer Research and Treatment</i>
2013-	Reviewer	<i>Oncogene</i>
2014-	Reviewer	<i>Pathobiology</i>
2014-	Reviewer	<i>British Journal of Applied Science &amp; Technology</i>
2014-	Reviewer	<i>International Journal of Laboratory Hematology</i>
2014-	Reviewer	<i>Neuroscience Letters</i>
2014-	Reviewer	<i>EMBO Medicine</i>
2014-	Reviewer	<i>Journal of Translational Medicine</i>
2014-	Reviewer	<i>Cancer Letters</i>
2014-	Reviewer	<i>Expert Review of Neurotherapeutics</i>
2014-	Reviewer	<i>Cereus</i>
2014-	Reviewer	<i>Molecular Oncology</i>
2014-	Reviewer	<i>eLife</i>
2014-	Reviewer	<i>Cancer Research Frontiers</i>
2015-	Reviewer	<i>Journal of Clinical Investigation</i>
2015-	Reviewer	<i>Journal of Neurosurgical Sciences</i>
2016-	Reviewer	<i>World Neurosurgery</i>
2016-	Reviewer	<i>Journal of Neurosurgery</i>
2016-	Reviewer	<i>Neurosurgery Focus</i>
2010	Grant Reviewer	<i>Hong Kong Brain Cancer Genome Consortium</i>
2010	Grant Reviewer	<i>Breast Cancer Campaign, United Kingdom</i>
2013	Grant Reviewer	<i>National Science Foundation China</i>
2013	Grant Reviewer	<i>Netherlands Organization for Scientific Research</i>
2014	Grant Reviewer	<i>Cancer Research UK</i>
2014	Grant Reviewer	<i>The Netherlands Organisation for Health Research and Development</i>
2015	Grant Reviewer	<i>Austrian Science Fund</i>
2009-10	Editor	<i>NeuroImage-IBMISPS</i>
2010-2	Editor	<i>PloSOne-NeuroMapping &amp; Therapeutics</i>
2011-	Editor	<i>InTech publishing</i>
2011-	Editor	<i>Journal of Healthcare Engineering</i>
2013-	Editor	<i>Journal of Neuro-Oncology</i>
2013-	Editor	<i>Surgical Neurology Internationale</i>
2013-	Editor	<i>Surgical Neurology Internationale Stereotactic</i>
2013-	Editor	<i>PloSOne</i>
2013-	Editor	<i>Gliomas</i>
2014-	Editor	<i>Austin Journal of Neurosurgery</i>
2014-	Editor	<i>Tumor</i>
2014-	Editor	<i>Oncoscience</i>
2014-	Associate Editor	<i>Neurosurgery</i>
2014-	Editorial Board	<i>Journal of Neurology, Neurosurgery, and Psychiatry</i>
2014-	Editorial Board	<i>Journal of Radiation Oncology and Research</i>

2013-	Editor-in-Chief	<i>Journal of Gene Therapy</i>
2015-	Editorial Advisory Board	<i>InTech publishing</i>
2016	Grant Reviewer	<i>Dutch Cancer Society</i>
2016	Grant Reviewer	<i>Quest for Cures</i>
2016-	Associate Editor	<i>Journal of Circulating Biomarkers</i>
2017	Editor	<i>Journal of Radiosurgery and SBRT</i>

### Honors and Prizes

1988-90	Regent Scholar	Stanford University	Scholastic
1989	Phi Beta Kappa	Stanford University	Scholastic
1990	Peat Marwick Scholarship	KPMG, CA	Scholastic
1990	Medical and Research Training Fellowship Award	Baylor College of Medicine	Research
1991	Student Research Abstract Award	American Gastroenterological Association	Research
1992	Scholar Research Fellowship Award	Stanford University	Research
1992	Undergraduate Outstanding Teaching Award	Stanford University	Teaching
1997-9	Graduate Research Fellowship Award	Ludwig Institute for Cancer Research	Research
1999	James Kerr Award for Excellence in Research	Ludwig Institute for Cancer Research	Research
2001	M.D.-Ph.D. student of the year, profiled in Dean's Report	Harvard Medical School	Scholastic and Research
2004-6	Physician-Scientist Post-Doctoral Fellowship Award	Damon Runyon Cancer Research Foundation	Research
2004	Scholar-in-Training Award	American Association for Cancer Research	Research
2006	Tumor Young Investigator Award	Congress of Neurological Surgeons	Research
2007	Scoville Resident Award	New England Neurosurgical Society	Research
2007	Scholar Award	Qiagen Inc	Research
2007	Resident Research Award	Academy of Neurological Surgeons	Research
2008	Career Award in Medical Sciences	Burroughs Wellcome Foundation	Research
2008	Paul Calabresi Scholar Award	National Institutes of Health	Research
2008	Tumor Young Investigator Award	Congress of Neurological Surgeons	Research
2009	Translational Research Award	National Brain Tumor Foundation	Research
2009	Forbeck Scholar Award	William Guy Forbeck Research Fund	Research
2010	Clinical Scientist Development Award	Doris Duke Charitable Foundation	Research

2010	Distinguished Scientist Award	Sontag Foundation	Research
2011	Developmental Research Program Award	Harvard/DFHCC SPORE grant	Research
2011	Kimmel Foundation Scholar Award	Kimmel Foundation	Research
2011	Charles McCabe Faculty Prize for Excellence in Teaching	Harvard Medical School	Teaching
2012	V Scholar Finalist	University of California, San Diego	Research
2012	Chancellor's Award	University of California, San Diego	Research
2013	Society of Neuro-Oncology Young Investigator	Society of Neuro-Oncology	Research
2013	Investigator Award	Medtronic	Research
2014	Rady School of Management, Executive Leadership	Rady School of Management	Leadership
2014	Clinical Investigator Award	Society of Neuro-Oncology	Research
2015	Visiting Professorship	Peking Union Medical Center	Scholarship
2015	Leskell Radiosurgery Award	American Association of Neurological Surgeons	Research
2016	Presidential Achievement Award	Taiwanese government	Research
2017	Lyle A French Chair in Neurosurgery	University of Minnesota	Leadership and Research
2018	Program for Chairs of Clinical Services	Harvard T.H. Chan School of Public Health	Leadership

## **Report of Funded and Unfunded Projects**

### **Funding Information**

#### **Past**

- 2005-6     Inhibitors of the Fanconi Anemia (FA) pathway as chemosensitizing agents for glioblastoma treatment  
Accelerated Brain Cancer Cure  
**Co-PI** (\$100,000)  
The goal of this study was to evaluate inhibitors of the FA DNA repair pathway as a strategy for augmenting the therapeutic efficacy of Temozolomide and BCNU in the treatment of glioblastoma. I authored the grant as a post-doctoral fellow and was responsible for all work produced.
- 2005-6     A siRNA-based approach to characterize pathways essential for cellular resistance to ionizing radiation  
Joint Center for Radiation Research  
**Co-PI** (\$50,000)  
The goal of this study was to utilize the siRNA technology to identify novel genes and pathways required for cellular response to ionizing radiation. I authored the grant as a post-doctoral fellow and was responsible for all work produced.
- 2006-7     Inhibition of ATM and CHK2 as treatment for glioblastoma multiforme  
Accelerated Brain Cancer Cure  
**Co-PI** (\$160,000)  
The goal of this study was to assess the *in vivo* effect of ATM and CHK2 inhibition on glioblastoma growth. I authored the grant as a post-doctoral fellow and was responsible for all work produced.
- 2008-9     A genome-wide synthetic lethality screen targeting p53-deficient tumors  
Joint Center for Radiation Therapy  
**PI** (\$40,000)  
The goal of this study is to identify strategies for targeting tumors deficient in p53 using a shRNA based strategy. The study proposes a genome-wide shRNA screen to identify gene silencing that selectively triggers cell death in p53 deficient tumors.
- 2008-9     Promoter methylation in GlioBlastoma Multiforme (GBM)  
National Brain Tumor Foundation  
**PI** (\$50,000)  
The goal of this study is to identify MGMT independent gene functions that are regulated by promoter methylation and affect glioblastoma response to DNA damaging agents
- 2008-10    Functional understanding of the glioblastoma genome: a large-scale RNAi screen  
NCI K12  
**PI** (\$200,000)  
The goal of this study is to identify new strategies for glioblastoma treatment by carrying out a genome-wide shRNA screen to identify genes required for tumor growth and survival.

- 2009-10 Functional profiling of glioblastoma  
Harvard Clinical and Translational Science Center, Harvard Catalyst Award  
**PI** (\$50,000)  
The goal of this study is to identify genes required for glioblastoma survival
- 2009-11 Understanding the genomic landscape of glioblastoma  
The Barr Foundation  
**PI** (\$183,798)  
The goal of this study is to establish a platform for discriminating “bystander” and “driver” mutations in the cancer genome using data derived from shRNA screens.
- 2011 Dopamine receptor 2 as a novel target for glioblastoma therapy  
American Brain Tumor Association  
**PI** (\$50,000)  
The goal of this study is to develop DRD2 antagonists as a therapeutic approach to glioblastomas
- 2011-13 Co-optation of G-protein coupled neurotransmitter receptor pathways in glioblastomas  
Kimmel Foundation  
**PI** (\$200,000)  
The goal of this proposal is to synthesize genomic profiles of glioblastoma with a genome-wide shRNA screen to identify novel therapeutic targets.
- 2014 Applications of radiosurgery in neurosurgery  
San Diego Gamma Knife Center  
**PI** (\$20,000)  
The goal of this proposal is to analyze the efficacy of radiosurgery in the treatment of the various neurosurgical lesions
- 2010-14 Identifying novel glioblastoma therapy by synthetic lethality  
Sontag Foundation  
**PI** (\$600,000)  
The goal of this proposal is to identify gene silencings that are synthetically lethal with Epidermal Growth Factor Receptor (EGFR) hyper-activation.
- 2010-15 Proteasome inhibition as subtype-specific therapeutic intervention in glioblastoma – a step toward personalized oncologic care  
Doris Duke Charitable Foundation  
**PI** (\$450,000), with no cost extension  
To test the clinical efficacy of proteasome inhibition in a glioblastoma subtype that over-expresses genes required for the Fanconi Anemia (FA) DNA damage response pathway
- 2012-15 Interdisciplinary research for early cancer diagnosis and clinical applications  
UCSD Chancellor’s Award  
**PI** (\$45,000)  
The goal of this proposal is to develop a microfluidic lab-on-a-chip design to extract and concentrate miRNAs from milliliters of patient serum and CSF.

- 2012-16 Porous Si-based therapeutic nano-platform for the treatment of penetrating brain injury  
Defense Advanced Research Projects Agency  
Multi-PI (\$6,500,00)  
The goal of this proposal is to develop nano-particles for the treatment of penetrating brain injury.
- 2013-15 Hydrogel as a vehicle for the delivery of glioblastoma therapy  
Nano-Pacific  
PI (\$160,000)  
The goal of this proposal is to develop the hydrogel platform as means of intracranial therapeutic delivery
- 2014-16 exRNA Biomarkers for Human Glioma  
NIH UH1/2 TR000931-01  
PI (\$999,998)  
The goal of this project is to establish exRNA as a biomarker platform for glioma diagnostics.
- 2014-17 Clinical Applications of Restriction Spectrum Imaging (RSI)  
Medtronic Research Foundation  
PI (\$100,000)  
The goal of this project is to establish radiographic-pathologic correlation of RSI based tractography

**Current**

- 2008-17 The molecular basis and therapeutic implications of genome instability during brain tumor progression  
Burroughs Wellcome Fund, Career Awards for Medical Scientists  
PI (\$700,000), with no cost extension  
The goal of this study is to understand mechanisms by which oncogenes trigger genomic instability.
- 2015-17 CSF and plasma extracellular vesicle (EV) miRNA as a biomarker platform for glioblastoma diagnostics  
Accelerated Brain Cancer Cure  
PI (\$150,000)  
The goal of this project is to establish a miRNA signature in CSF and plasma to facilitate “liquid biopsy” in glioblastoma patients.
- 2015-17 Minimally invasive glioblastoma biomarkers  
International S&T Cooperation Program of China, 2014DFA31470  
PI (\$200,000)  
The goal of this project is to develop minimally invasive biomarkers for glioblastoma patients

- 2014-17 Minimally invasive biomarker development  
Department of Defense W81XWH-14-2-0192  
Multi-PI (\$1,871,874)  
The goal of the project is to develop novel biomarkers platforms for cancer
- 2016-19 exRNA biomarkers for human glioma  
NIH 4UH3TR000931-03  
Co-PI (\$3,040,850)  
The goal of this project is to develop minimally invasive exRNA biomarkers for detection of human glioma
- 2016-21 Targeting mechanisms of acquired temozolomide resistance in glioblastoma  
NIH 1RO1NS097649-01  
PI (\$1,937,500)  
The goal of this project is to understand mechanisms underlying temozolomide resistance in glioblastoma and to develop therapeutic approaches targeting these mechanisms
- 2017-19 Single cell epigenetic profiling of glioblastoma  
Celgene  
Multi-PI (\$1,021,066)  
The goal of this project is to provide single cell epigenetic profiling of the various cell populations in clinical glioblastoma specimens
- 2017-19 High-throughput single-cell sorting and kinetic analysis of secreted particles  
NIH 9R44GM128223-02  
Multi-PI (\$700,960)  
The goal of this project is to develop technology platforms that afford dynamic phenotypic tracking of single cells
- 2018-19 **Tumor microenvironment modulation mediated glioblastoma therapy**  
Shaver Foundation  
PI (\$25,000)  
The goal of this project is to develop PI3K $\gamma$  inhibitors as a glioblastoma therapy

**Other research studies**

- 2008-11 SOM230C for recurrent or progressive meningioma  
DFCI#: 08-266  
Sponsor: Novartis  
Role: Co-Investigator
- 2008-11 Armodafinil (Nuvigil) for fatigue in glioma patients undergoing radiotherapy  
DFCI#: 07-341  
Sponsor: Cephalon  
Role: Co-Investigator
- 2008-11 Phase III study of radiation therapy with or without temozolomide for symptomatic or progressive low-grade gliomas  
DFCI#: 10-300  
Sponsor: ECOG  
Role: Co-Investigator
- 2008-11 Zactima ZD6474 (vandetanib) with radiation + Temodar for new GBM  
DFCI#: 06-377  
Sponsor: Astra Zeneca  
Role: Co-Investigator
- 2008-11 Phase I trial of Aflibercept (VEGF Trap) with radiation therapy and concomitant and adjuvant temozolomide in patients with malignant glioma  
DFCI#: 08-108  
Sponsor: DFCI  
Role: Co-Investigator
- 2008-11 A Phase I dose finding study of the safety and PK's of XL184 administered orally in combination with TMZ and RX therapy in the first line treatment of subjects with GBM  
DFCI#: 09-291  
Sponsor: Exelixis  
Role: Co-Investigator
- 2008-11 A Phase III double blind placebo controlled trial of conventional concurrent chemoradiation and adjuvant temozolomide plus bevacizumab versus conventional concurrent chemoradiation and adjuvant temozolomide in patients with newly diagnosed glioblastoma  
DFCI#: 09-256  
Sponsor: RTOG  
Role: Co-Investigator
- 2008-11 Phase III trial on concurrent and adjuvant temozolomide chemotherapy in non-1p/19q deleted anaplastic glioma. The CATNON Intergroup trial  
DFCI#: 10-174  
Sponsor: RTOG  
Role: Co-Investigator

- 2008-11 CT-322 Angiocept with or without Irinotecan for recurrent GBM  
DFCI#: 07-279  
Sponsor: Adnexus  
Role: Co-Investigator
- 2008-11 XL184-201 for progressive or recurrent GBM first or second relapse  
DFCI#: 07-400  
Sponsor: Exelixis  
Role: Co-Investigator
- 2008-11 A biomarker and Phase II study of GDC-0449 in patients with recurrent GBM  
DFCI#10-044  
Sponsor: Astra Zeneca (ABTC 0904)  
Role: Co-Investigator
- 2008-11 Metronomic Temodar for recurrent gliomas  
BIDMC#2006-93  
Sponsor: Schering  
Role: Co-Investigator
- 2008-11 Study of the treatment of recurrent primary or secondary CNS lymphoma with ALIMTA (Premetrexed), a novel anti-folate agent  
DFCI#06-097  
Sponsor: Eli Lilly  
Role: Co-Investigator
- 2011-17 Study Name: Randomized, Double-Blind, Controlled, Phase II Trial for Newly Diagnosed Patients with Stage IV Glioblastoma Multiforme (GBM) following Resection and Chemo-Radiation  
ITCL-107-201  
Sponsor: ImmunoCellular Therapeutics  
Role: Co-Investigator
- 2011-17 Cilengitide in subjects with newly diagnosed glioblastoma multiforme and unmethylated MGMT gene promoter – a multicenter, open-label Phase II study, investigating two cilengitide regimens in combination with standard treatment  
CORE EMD121974-012  
Sponsor: EMD Serono (Merck)  
Role: Co-Investigator
- 2011-17 Phase 2 study of Verubulin (MPC-6827) with radiation therapy and tomozolomide in newly diagnosed glioblastomas  
MPC-6827-021.02  
Sponsor: Myrexix  
Role: Co-Investigator

- 2011-17 A phase I/II study of PDGFR kinase inhibitor in biomarker-enriched recurrent malignant gliomas  
CAMN107DUS18T  
Sponsor: Novartis  
Role: Co-Investigator
- 2011-17 Neurologic Outcomes in Cancer  
NOC  
Sponsor: UCSD  
Role: Co-Investigator
- 2011-17 A Phase I ascending dose trial of the safety and tolerability of Toca511 in patients with recurrent glioblastoma  
TG511-08-01  
Sponsor: Tocagen  
Role: Co-Investigator
- 2012-17 DCVax-Brain (Autologous Dendritic cells and GBM tumor lysate)  
020221  
Sponsor: Northwest therapeutics  
Role: Co-Investigator
- 2015-17 Laser Ablation of Abnormal Neurological Tissue using Robotic Neuroplate System (LAANTERN). University of California site.  
150672  
Sponsor: Monteris  
Role: Primary Investigator
- 2018- A Phase 2/3 Randomized, Open-Label Study of Toca 511, a Retroviral Replicating Vector, Combined With Toca FC versus Standard of Care in Subjects Undergoing Planned Resection for Recurrent Glioblastoma or Anaplastic Astrocytoma  
Sponsor: Tocagen  
Role: Primary Investigator
- 2018- Exosome as biomarker platform for glioblastoma  
Sponsor: Investigator initiated  
Role: Primary Investigator
- 2018- Laser Ablation of Abnormal Neurological Tissue using Robotic Neuroplate System (LAANTERN). University of Minnesota site.  
Sponsor: Monteris  
Role: Primary Investigator

## **Report of Local Teaching and Training**

### **Teaching of Students in Courses**

- 1995 Tutor, Genetics and Embryology, Harvard Medical School  
1<sup>st</sup> year HMS students (3-hr sessions per week for 4 weeks)
- 1996-7 Tutor, Pharmacology, Harvard Medical School  
1<sup>st</sup> year HMS students (3-hr sessions per week for 4 weeks)
- 2004-5 Neuroanatomy, Harvard Medical School  
2<sup>nd</sup> year HST students (3-hr sessions per week for 4 weeks)
- 2009-11 Introduction to head and spinal trauma, Beth Israel Deaconess Medical Center  
3<sup>rd</sup> year medical students (1-hr lecture, 3 lectures per year)
- 2009-11 Examiner, core general surgery clerkship final examination , Beth Israel Deaconess Medical Center, administer oral examination to third year medical students (4-hr commitment, 3 examinations per year)
- 2009-11 Neurosurgery preceptor, core general surgery clerkship, Beth Israel Deaconess Medical Center  
Supervise 3<sup>rd</sup> year medical students for the two week elective neurosurgery rotation
- 2011- Neurosurgery preceptor, core general surgery clerkship, University of California, San Diego  
Supervise 3<sup>rd</sup> year medical students for the four week neurosurgery rotation
- 2011- Neurosurgery preceptor, neurosurgery clerkship, University of California, San Diego  
Supervise 4<sup>th</sup> year medical students for the four week neurosurgery rotation
- 2012- Introduction to Neurosurgery, University of California, San Diego  
Weekly tutorial for third year medical students
- 2013- Topics in Neurosurgery, University of California, San Diego  
Weekly tutorial for first year and second year medical students
- 2013- Fundamentals in Neurosurgery, University of California, San Diego  
Weekly tutorial for four year medical students with focused interest in neurosurgery
- 2014- Lecturer, BIMM110, Molecular Basis of Human Disease, University of California, San Diego
- 2015- Lecturer, BISP170, BioScholar Seminar, University of California, San Diego

### **Formal Teaching of Residents, Clinical Fellows and Research Fellows**

- 2007-8 Fundamentals of Neurosurgery, Massachusetts General Hospital  
Neurosurgery residents (1-hr didactic per week over a six month period)
- 2008-11 Management of Brain Cancer, Beth Israel Deaconess Medical Center  
Neurology residents (1-hr lecture, 1 lectures per year)
- 2009-11 Radiation resistance in glioblastoma stem cells, Dana Farber Cancer Institute  
Radiation oncology residents (1-hr lecture, a lecture per year)
- 2009-11 Management of cerebral metastasis, Beth Israel Deaconess Medical Center  
Medical oncology residents (1-hr lecture, 1 lectures per year)
- 2010-11 Spinal cord compression, Beth Israel Deaconess Medical Center  
Medical oncology residents and neurology residents (1-hr lecture, a lecture per year)
- 2010-11 Neurosurgical neurology, Beth Israel Deaconess Medical Center  
Neurology residents (1-hr lecture, ten lectures per year)

- 2011- Neurosurgery Lecture, University of California San Diego (1-hr session, three sessions per year)
- 2011- Neurosurgery Tutorial, University of California, San Diego (1-hr weekly sessions, thirty sessions per year)
- 2014- General Surgery Resident Didactic (1-hr weekly sessions, three sessions a year), University of California, San Diego

### **Clinical Supervisory and Training Responsibilities**

- 2001-8 Medical student preceptor, Neurosurgery clerkship, Massachusetts General Hospital  
Daily supervision of medical students for the duration of rotation
- 2003-8 Resident preceptor, Department of Neurosurgery, Massachusetts General Hospital  
Daily supervision of junior surgical and neurosurgery residents
- 2009-11 Medical student preceptor, Department of Surgery, Beth Israel Deaconess Medical Center  
Daily supervision of medical students during their neurosurgery rotation
- 2009-11 Resident preceptor, Department of Surgery, Beth Israel Deaconess Medical Center  
Daily supervision of surgery residents during their neurosurgery rotation
- 2011- Resident preceptor, Division of Neurosurgery, University of California San Diego  
Daily supervision of neurosurgery residents

### **Laboratory and Other Research Supervisory and Training Responsibilities**

- 2008- Supervision of post-doctoral research fellow and graduate student research  
Daily mentorship

### **Supervised Trainees**

#### ***Laboratory***

- 2004-6 Yuko Hasegawa, M.S.  
Ph.D. candidate, Brown University, RI
- 2008-9 Grace Hsieh, B.S.  
Medical Student, Harvard Medical School
- 2008-10 Masayuki Nitta, M.D., Ph.D.  
Neuro-oncology neurosurgeon, Tokyo Women's Hospital
- 2008-10 David Kozono, M.D., Ph.D.  
Instructor, Department of Radiation Oncology, Brigham and Women'
- 2008-10 Dimitri Merzon, B.S.  
Dental student, Boston University Dental School
- 2009-10 Lydia Price, summer student from the Continuing Umbrella of Research Experience (CURE) program – a cancer research training program for underrepresented minority students
- 2010-12 Che-Chuan Wang, M.D.  
Neurosurgery attending, Chi-Mei Medical Center, Tainan, Taiwan
- 2008-11 Kimberly Ng, B.S.  
Medical Student, Royal College of Surgeons, Ireland
- 2008-11 Pascal Zinn, M.D.  
Neurosurgery residency, M.D. Anderson Medical Center
- 2009-11 Deepa Kushwaha, Ph.D.

- Post-doctoral fellow, Dana Farber Cancer Institute
- 2009-11 Shan Zhu, Ph.D.  
Instructor, Virginia Commonwealth University
- 2011-12 Jianguo Xu, M.D.  
Attending Neurosurgeon, First China Hospital, China
- 2011-12 Wei Yan, M.D.  
Neurosurgery Resident, Tiantan Hospital, China
- 2012-13 Rui Liu, M.D.  
Attending Neurosurgeon, PLA Navy General Hospital, China
- 2011-13 Diahnn Futalan, B.S.  
Medical Student, University of California, Irvine
- 2011-13 Ying Shen, Ph.D.  
Assistant Professor, Shanghai Jiaotong University School of Medicine
- 2012-13 Zack Taich, M.D.  
Medical Student, Columbia University School of Medicine
- 2012-13 Amit Goyal, M.D.  
Medical Student, University of California, San Diego
- 2012-13 Teddy Kim, M.D., neurosurgery resident, Wake Forest
- 2012-13 Ashin Salehi, neurosurgery resident, Washington University
- 2011-17 Johnny Akers, Ph.D., Post-doctoral fellow, University of California, San Diego
- 2011-12 Dawn Waters, M.D., Practicing neurosurgeon
- 2011-13 David Gonda, M.D., Assistant Professor in Neurosurgery, University of California, San Diego
- 2011-14 Pouya Jamshidi, medical student, Cornell University
- 2011-15 Steed Tyler, medical student, University of California, San Diego
- 2012-16 Thien Nguyen, medical student at the University of California, Los Angeles
- 2013-15 Kunal Patel, medical student, neurosurgery resident at University of California, Los Angeles
- 2013-14 Jiangfei Wang, Assistant Professor in Neurosurgery, Tiantan Medical Center, China
- 2013-14 Norman MacKenzie, undergraduate student, John Hopkins University
- 2013-14 Abrahma Noorbakhsh, medical student, University of California, San Diego
- 2013-15 Grace Lai, neurosurgery resident, Northwestern University
- 2013-15 Pouya Jamshidi, medical student, Cornell University
- 2013-15 Sean Lawless, medicine resident, University of California, Los Angeles
- 2013-14 Amit Goyal, completed MD training (University of California, San Diego)
- 2013-15 Ashin Salehi, neurosurgery resident, Washing University
- 2013-15 Logan Marcus, neurosurgery resident, University of California, Los Angeles
- 2013-15 Brandon McCutcheon, neurosurgery resident, Mayo Clinic
- 2013-15 Zhi Dong, medical student, University of California, San Diego
- 2014-16 Bianca Yang, undergraduate student, California Institute of Technology
- 2014-16 Jeffrey Treiber, medical student, University of California, San Diego
- 2014-16 Brian Hirshman, medical student, University of California, San Diego
- 2014-16 Justin Scheer, medical student, University of California, San Diego
- 2014-16 Jessica Tang, medical student, University of California, San Diego
- 2014-16 Bayard Wilson, medical student, University of California, San Diego
- 2014-16 Deborah Wilson, medical student, University of California, San Diego
- 2014-16 Tianzan Zhou, medical student, University of California, San Diego
- 2014-16 Jennifer Padwal, medical student, University of California, San Diego
- 2014-16 Michael Brandel, medical student, University of California, San Diego

- 2014-16 Ali Alattar, medical student, University of California, San Diego
- 2011- Jie Li, Ph.D., current lab member
- 2011- Valya Ramakrishnan, current lab member

***Clinical***

- 2011-13 Dawn Waters, M.D.  
Neurosurgery Resident
- 2011-13 Jayant Mennon, M.D.  
Neurosurgery Resident
- 2011-14 Chiazio Amene, M.D.  
Neurosurgery Resident
- 2011-14 David Gonda, M.D.  
Neurosurgery Resident
- 2011-15 David Weingarten, M.D.  
Neurosurgery Resident
- 2011-16 Jayson Sack, M.D.  
Neurosurgery Resident
- 2011-16 Matthew MacDougall, M.D.  
Neurosurgery Resident
- 2011-17 Eric Curtis, M.D.  
Neurosurgery Resident
- 2011-17 Brandon Gabel, M.D.  
Neurosurgery Resident
- 2011-17 Gunjan Goel, M.D.  
Neurosurgery Resident
- 2011-17 Dustin Hatefi, M.D.  
Neurosurgery Resident
- 2012-17 Reid Hoshidi, M.D.  
Neurosurgery Resident
- 2012-17 Vincent Cheung, M.D.  
Neurosurgery Resident
- 2013-17 David Santiago-Dieppa, M.D.  
Neurosurgery Resident
- 2013-17 Jeffrey Steinberg, M.D.  
Neurosurgery Resident
- 2014-17 Robert Rennert, M.D.  
Neurosurgery Resident
- 2014-17 Joel Martin, M.D.  
Neurosurgery Resident
- 2015-17 Mihir Gupta, M.D.  
Neurosurgery Resident
- 2015-17 Daniel Clary, M.D.  
Neurosurgery Resident
- 2016-17 Brian Hirshman, M.D., Ph.D.  
Neurosurgery Resident
- 2016-17 Usman Khan, M.D., Ph.D.  
Neurosurgery Resident
- 2017- Amit Goyal, M.D.

2017- Neurosurgery Resident  
Akshay Gupte, M.D., MPH  
2017- Neurosurgery Resident  
Molly Hubbard, M.D.  
2017- Neurosurgery Resident  
Joshua Lim, M.D.  
2017- Neurosurgery Resident  
David Darrow, M.D., MPH  
2017- Neurosurgery Resident  
Coridon Quinn, M.D.  
2017- Neurosurgery Resident  
Adam Khan, M.D.  
2017- Neurosurgery Resident  
Jack Leschke, M.D.  
2017- Neurosurgery Resident  
Lauren Albert Sand, M.D.  
2017- Neurosurgery Resident  
David Freeman, M.D.  
2017- Neurosurgery Resident  
Samuel Carmer, M.D., Ph.D.  
2017- Neurosurgery Resident  
Bryan Ladd, M.D.  
2017- Neurosurgery Resident  
Huy Donguyen, M.D.  
2017- Neurosurgery Resident  
Youssef, Hamade, M.D., M.S.  
Neurosurgery Resident

**Formal Teaching of Peers (e.g., CME and other continuing education courses)**

2006 Lecture, “Mechanism of temozolomide resistance”, Neuro-Oncology Conference  
Harvard Medical School, Boston  
2007 Lecture, “DNA repair in glioma therapy”, Neuro-Oncology Conference  
Harvard Medical School, Boston  
2008 Lecture, “Tumor Cancer Genome Atlas (TCGA) project”, Neuro-Oncology Conference  
Harvard Medical School, Boston  
2009 Lecture, “High grade gliomas: resection versus biopsy”, Neuro-Oncology Conference  
Harvard Medical School, Boston  
2013 Instructor, Senior Neurosurgical Society, Annual Resident Training (Bootcamp), University  
of California, San Diego  
2013 Lecture, Continued Medical Education Seminar, “Tractography for surgical planning”,  
Institute of Medical Education, San Diego

**Local Invited Presentations**

- 2003 Grand Rounds, “Decompressive craniectomy”, BWH
- 2005 Grand Rounds, “Radiosurgery for treatment of dural arteriovenous fistulas”, MGH
- 2006 Grand Rounds, “Mutagenesis: from yeast to men”, MGH
- 2006 Grand Rounds, “Radiosurgery for primary CNS lymphoma”, MGH
- 2007 Grand Rounds, “Strategies for glioma therapy”, MGH
- 2007 Lecture, “RNAi and miRNA screening”, Harvard Medical School Workshop for Functional Genomics (sponsored by Qiagen)
- 2008 Lecture, “A siRNA screen for novel components of the Fanconi Anemia DNA repair pathway”, First annual conference on small molecule and RNAi screening, Harvard Medical School
- 2009 Grand Rounds, “Non-invasive and minimally invasive neurosurgery”, Cambridge Hospital, Department of Medicine, MA
- 2009 Grand Rounds, “Emerging evidence in the treatment of brain cancer”, Beth Israel Deaconess Medical Center Needham Campus, MA
- 2009 Lecture, “Targeting DNA repair: a proof of principle in non-oncogene addiction”, MGH Neuro-Oncology Conference
- 2009 Lecture, “Genome-wide and small scale siRNA screens in glioblastoma therapeutic development”, MGH
- 2009 Lecture, “Molecular predictors of PARP1 sensitivity in glioblastoma therapy”, Neuro-Oncology Conference, BWH
- 2009 Lecture, “PSMA1, a novel prognostic factor in glioblastoma patients”, Neuro-Oncology conference, BWH
- 2010 Lecture, “A prognostic DNA repair signature for proneural glioblastoma patients”, Neuro-Oncology Conference, MGH
- 2010 Lecture, “Scrutiny of MGMT promoter methylation as a prognostic/predictive biomarker in glioblastoma therapeutics”, Neuro-Oncology Conference, BWH
- 2010 Seminar, “micro-RNA regulating MGMT”, Clowes research seminar, BIDMC
- 2011 Lecture, “What can power outage teach us about glioblastoma therapeutic development”, Brain Tumor Conference, University of California, San Diego
- 2011 Grand Rounds, “An update on radiosurgery in the treatment of cerebral metastasis”, Division of Neurosurgery, University of California, San Diego
- 2011 Grand Rounds, “5-ALA (Aminolevulinic acid): towards improved resection of glioblastoma”, Department of Surgery, University of California, San Diego
- 2011 Student Seminar, “Neurosurgery: personal reflections”, Medical School, University of California, San Diego
- 2012 Neurosurgery Didactic Rounds, “Management of global and focal hydrocephalus”, Division of Neurosurgery, University of California, San Diego
- 2012 Neurosurgery Didactic Rounds, “Management of pituitary lesions”, Division of Neurosurgery, University of California, San Diego
- 2012 Medical Scientist Training Program (MSTP) symposium, “Unique opportunities for MD PhD candidates -- a neurosurgeon’s perspective”, University of California, San Diego
- 2012 Grand Rounds, “Neurosurgical trials in oncology”, Division of Neurosurgery, University of California, San Diego
- 2013 General Surgery Didactic Rounds, “Learning Neurosurgical Principles through Case Vignettes”, Department of Surgery, University of California, San Diego

- 2013 Neurosurgery Grand Rounds, “UCSD Neurosurgical Oncology: A Comprehensive Overview”, Division of Neurosurgery, University of California, San Diego
- 2013 UCSD-Mexico National Institute of Neurosurgery Symposium, “Advances in Neurosurgical Oncology”, University of California, San Diego
- 2013 Grand Rounds, “Intracranial delivery of oncolytic viruses: a surgical treatment paradigm for glioblastoma”, Department of Surgery, University of California, San Diego
- 2014 General Surgery Resident Didactic, “Management of head and spinal trauma”, Department of Surgery, University of California, San Diego
- 2014 General Surgery Resident Didactic, “Traumatic peripheral nerve injuries”, Department of Surgery, University of California, San Diego
- 2014 Moores Cancer Center Symposium, “Therapeutic insights from functional and genomic characterization of glioblastomas”, University of California, San Diego
- 2014 Neurosurgery Grand Rounds, “MRI-guided neurosurgery”, University of California, San Diego
- 2014 Surgery Grand Rounds, “Operating on the inoperable through surgical innovation”, University of California, San Diego
- 2014 Neurosurgery Grand Rounds, “Natural history and treatment options for acoustic neuroma”, University of California, San Diego
- 2015 Neurosurgery Interest Group, “Neurosurgery: Career considerations”, University of California, San Diego
- 2015 BioScholar Seminar, “Brain tumors, neurosurgery, and molecular biology”, University of California, San Diego
- 2015 Neurosurgery Grand Round, “The facts and myths of radiosurgery”, University of California, San Diego
- 2015 Invited Speaker, “Consideration for Medical School Applicants”, Muir Eventual Doctors (MED), University of California, San Diego
- 2015 Invited Speaker, “Molecular basis of tumorigenicity”, Cancer Cell Biology Seminar, University of California, San Diego
- 2015 Radiation Medicine Grand Rounds, “Molecular subtypes of glioblastoma: therapeutic and radiographic implications”, University of California, San Diego
- 2015 Invited Lecture, “miRNA as a therapeutic and diagnostic platform for glioblastomas”, Biochemistry Department, University of California, San Diego
- 2015 Invited Lecture, “Dynamic tumorigenic states in glioblastoma”, Moores Cancer Solid Tumor Program, University of California, San Diego
- 2016 Invited Lecture, “Becoming a neurosurgeon”, Neurosurgery Interest Group, University of California, San Diego
- 2016 Neurosurgery Grand Round, “Surgical Resection in Neuro-Oncology” University of California, San Diego
- 2016 Invited presentation, “Dynamic transition between glioblastoma tumorigenic states”, Research Symposium, Department of Surgery, University of California, San Diego
- 2016 Invited lecture, “Case based learning in neurosurgery”, Department of Surgery, University of California, San Diego
- 2016 Neuroscience Grand Round, “MRI-guided surgery in neuro-oncology”, University of California, San Diego
- 2017 Radiation Oncology Grand Round, “Cumulative intracranial tumor volume in stereotactic radiosurgery”, University of California, San Diego
- 2017 Invited lecture, “Molecular determinant of ‘exceptional’ response’ in glioblastoma”, Brain Tumor Program, University of Minnesota, Minneapolis

- 2017 Invited lecture, “Radiosurgery through LINAC platform”, Department of Radiation Oncology, University of Minnesota, Minneapolis
- 2018 Invited lecture, “Dynamic transition between stem cell and non-stem cell states in glioblastoma”, Stem Cell Institute, University of Minnesota, Minneapolis
- 2018 Invited participant, “Career Trajectory in Research”, Stem Cell Institute, University of Minnesota, Minneapolis

**Regional Invited Presentations and Courses**

- 2004 Plenary talk, “The use of involved field-radiation in Primary Central Nervous System Lymphoma (PCNSL)”, New England Neurosurgical Society
- 2005 Plenary talk, “Integrity of the Fanconi Anemia (FA) pathway in glioblastoma multiforme cell lines – a novel molecular target for cancer therapy”, New England Neurosurgical Society
- 2005 Plenary talk, “A high-throughput microscopy-based screen for the identification of small molecules that potentiate BCNU therapy in glioblastoma multiforme treatment”, New England Neurosurgical Society
- 2006 Plenary talk, “Using siRNAs to identify genes required for radiation resistance”, New England Neurosurgical Society
- 2006 Plenary talk, “Multiple DNA repair pathways contributing to TMZ and BCNU resistance in malignant gliomas”, New England Neurosurgical Society
- 2007 Plenary talk, “Two unusual cases from the Massachusetts General Hospital Spine Service: a posterior cervical spine dermal sinus tract and a case of osseous sarcoid”, New England Neurosurgical Society
- 2008 Plenary talk, “Proteasome inhibition in the treatment of malignant glioma”, New England Neurosurgical Society
- 2009 Grand Rounds, “Management of brain cancer”, Jordan Hospital, Department of Medicine, MA
- 2009 Grand Rounds, “Brain metastasis: disease of the upcoming century”, St. Anne’s Hospital, Department of Medicine, MA
- 2009 Lecture, “Emerging evidence in treatment strategies for glioblastoma”, Merrimack Hospital Continuing Medical Education, MA
- 2009 Lecture, “Management of brain metastasis”, St. Luke Hospital Continuing Medical Education, MA
- 2009 Lecture, “Therapeutic strategies for glioblastoma”, Milton Hospital Continuing Medical Education, MA
- 2009 Grand Rounds, “Management of glioblastoma, an update”, St. Vincent Hospital, Worcester, MA
- 2009 Lecture, “Management of spinal metastasis”, Beverly Hospital, Northshore, MA
- 2010 Lecture, “Surgical resection in brain cancer treatment”, Saint Medical Center, Lowell, MA
- 2010 Lecture, “Resection versus biopsy in brain cancer treatment”, St. Luke Medical Center, New Bedford, MA
- 2011 Biomedical and Clinical Research Seminar, “RNAi screening for genetic determinants of radiation sensitivity in glioblastoma, Hillcrest Hospital, CA
- 2012 Lecture, “Indication for surgery in patients with cerebral metastases”, Brain Tumors: 2<sup>nd</sup> Annual Collaborative Care Conference, San Diego, CA
- 2012 Lecture, “Individualized management of acoustic neuroma”, Acoustic Neuroma Society, San Diego, CA
- 2012 Seminar presentation, “Stereotaxis in modern neuro-oncology”, San Diego Academy of Neurosurgery, San Diego
- 2012 Seminar presentation, “Indications for Neuro-endoscopy”, Workshop on neuro-endoscopy, University of California, San Diego
- 2013 Lecture, “Radiosurgery, Perspective of a Neurosurgeon”, Radiosurgery Seminar, Chico, California

- 2013 Lecture, "Clinical Specimens in Brain Tumor Research", Sanford Consortium, San Diego, California
- 2013 Invited discussant, "Partnerships for a cure: industry-academic collaborations", Accelerated Brain Cancer Cure, San Diego, California
- 2013 Lecture, "Driving personalized cancer care by minimally invasive biomarkers " , San Diego Chinese American Science and Engineering Association Annual Meeting, San Diego California
- 2013 Lecture, "Translational opportunities in glioma research", Salk Institute, San Diego, California
- 2014 Lecture, "Neurosurgical research at UCSD", Surgical Research Annual Symposium, San Diego, California
- 2014 Invited panelist, "Collaborating to drive brain cancer research in San Diego", ABC2 Science Salon, San Diego, California
- 2014 Invited Lecture, "Fundamental Stereotactic Neurosurgery", 2014 Senior Society of Neurosurgeon Junior Resident Course, San Diego, CA
- 2014 Lecture, "Radiosurgery for Neurosurgeons", Mercy Cancer Institute, Sacramento CA
- 2014 Lecture, "Retroviral delivery of miRNAs", Tocagen, San Diego, CA
- 2014 Invited Lecture, "Natural history and treatment options for acoustic neuromas and brain metastasis", 2014 California Society of Radiation Technologists Annual Meeting, San Diego, CA
- 2015 Invited Lecture, "Stereotaxis in Neurosurgery", 2015 Senior Society of Neurosurgeon Junior Resident Course, San Diego, CA
- 2015 Invited Lecture, "Viral mediated delivery of microRNA", Tocagen, San Diego, CA
- 2015 Invited Lecture, "Neurologic Procedures in MRI", Critical Care Summer Session, San Diego, CA
- 2016 Invited Lecture, "Evolution of neurosurgical research", University of California San Diego, School of Medicine, San Diego, CA
- 2016 Invited Lecture, "Advances in modern radiosurgery", Riverside, CA
- 2017 Invited Lecture, "MRI-guided neurosurgery", Eisenhower Medical Center, Rancho Mirage, CA
- 2017 Invited Lecture, "No heavier burden than...", Minnesota Neurosurgical Society, Rochester, MN
- 2017 Invited Lecture, "Neuronal activity and brain cancer", Association of Minnesota Chinese Physicians, Bloomington, MN

**National Invited Presentations and Courses**

- 1992 Plenary talk, “Murine intestinal mucins inhibit rotavirus replication”, American Gastroenterological Association Annual Meeting
- 1997 Plenary talk, “*Saccharomyces cerevisiae pol30* (PCNA) mutations impair replication fidelity and mismatch repair”, Cold Spring Harbor Eukaryotic DNA Replication Meeting
- 2004 Plenary talk, “Rationale for selective use of proton and photon irradiation in brain tumor treatment”, American Association of Neurological Surgeons/Congress of Neurological Surgeons, Section on Tumors Annual Meeting
- 2005 Mini-symposium talk, “The Fanconi Anemia (FA) pathway confers cellular resistance to the chemotherapeutic agent 1,3-Bis(2-Chloroethyl)-1-Nitrosourea (BCNU)”, American Association for Cancer Research Annual Meeting
- 2006 Symposium talk, “A siRNA-based analysis of cellular response to ionizing radiation revealed novel therapeutic targets for cancer therapy”, American Association for Cancer Research Annual Meeting
- 2006 Symposium talk, “Functional analysis of brain tumor resistance to radiation therapy”, Congress of Neurological Surgeons Annual Meeting
- 2007 Plenary talk, “Radiosurgery for Primary Central Nervous System Lymphoma (PCNSL)”, International Stereotactic Radiosurgery Society Bi-Annual Meeting
- 2007 Symposium talk, “Targeting EGFR over-expression in glioblastoma multiforme by inhibition of DNA repair”, Congress of Neurological Surgeons Annual Meeting
- 2007 Symposium talk, “Selective sensitization of glioma cells with EGFR hyperactivity”, Academy of Neurological Surgeons Annual Meeting
- 2007 Grand Rounds, “Strategies for augmenting the efficacy of radiation and chemotherapy therapy in the treatment of high grade glioma”, City of Hope, Department of Neurosurgery
- 2007 Grand Rounds, “Mechanism of glioblastoma resistance to Temozolomide”, Emory University, Department of Neurosurgery
- 2007 Grand Rounds, “Proton radiosurgery”, Emory University, Department of Neurosurgery
- 2007 Invited lecture, “Applications of siRNA screening”, Rockefeller University, New York
- 2008 Invited lecture, “Clinical applications of RNAi screening”, Applications of RNAi and MicroRNAs, Boston
- 2008 Symposium talk, “siRNA screen reveals novel strategies for malignant glioma therapy”, Congress of Neurological Surgeons Annual Meeting
- 2009 Invited discussant, forum for glioblastoma therapeutic development, Accelerated Brain Cancer Cure
- 2009 Symposium talk, “Combined physiological targeting for stereotactic biopsies in tumors after combined anti-angiogenesis treatment”, American Association of Neurological Surgeons Annual Meeting
- 2009 Symposium talk, “Increased reliance on DNA repair in malignant gliomas with hyperactive EGFR: a proof of principle in targeting non-oncogene addiction”, American Society for Microbiology Conference on DNA repair
- 2009 Symposium talk, “Functional mapping for detection of tumor recurrence after anti-angiogenic therapy”, The 6<sup>th</sup> Annual World Congress for Brain Mapping and Image Guided Therapy
- 2009 Session chair, “Brain mapping in psychiatry”, The 6<sup>th</sup> Annual World Congress for Brain Mapping and Image Guided Therapy

- 2009 Grand Rounds Speaker, “Stereotaxis in neuro-oncology”, Division of Neurosurgery, University of California, San Diego
- 2009 Invited Speaker, “Targeting EGFR induced oxidative stress by PARP1 inhibition in glioblastoma therapy”, Neuro-oncology conference, University of California, San Diego
- 2009 Invited discussant, Forbeck forum for glioblastoma therapeutic development
- 2010 Symposium talk, “Synthetic lethality and DNA repair”, American Association for Cancer Research Annual Meeting
- 2010 Neurosurgical Forum presentation, “Assessment of sub-clonal heterogeneity in glioblastomas using COLD PCR”, Congress of Neurological Surgeons Annual Meeting
- 2010 Neurosurgical Forum presentation, “Identification of glioblastoma predisposing single nucleotide polymorphisms (SNPs) in the TP53 gene”, Congress of Neurological Surgeons Annual Meeting
- 2010 Symposium talk, “Image guided stereotactic third ventriculostomy”, The 7<sup>th</sup> Annual World Congress for Brain Mapping and Image Guided Therapy
- 2010 Session chair, “New Horizons in neuro-oncology”, The 7<sup>th</sup> Annual World Congress for Brain Mapping and Image Guided Therapy
- 2010 Invited Speaker, “An integrative genomic approach to glioblastoma therapy”, Neuro-oncology conference, University of California, San Diego
- 2010 Invited discussant, forum for glioblastoma therapeutic development, Accelerated Brain Cancer Cure
- 2010 Symposium talk, “miRNA regulating MGMT”, Forbeck Scholar Retreat, Forbeck Foundation
- 2010 Grand Rounds, “Base excision repair in glioblastoma therapeutic development”, University of Texas Medical Branch Comprehensive Cancer Center
- 2010 Visiting Professorship, “History and future of stereotactic surgery”, Division of Neurosurgery, University of Texas Medical Branch
- 2010 Symposium talk, “*in vitro* derived gene signatures to predict survival in glioblastoma patients” 15<sup>th</sup> Annual Meeting of the Society for Neuro-Oncology
- 2011 Symposium talk, “Development and validation of a robust predictive/prognostic gene signature for glioblastoma patients” 2011 American Association of Neurological Surgeons Annual Meeting
- 2011 Symposium talk, “Post-transcriptional regulation of MGMT: Implication on the prognostic/predictive value of MGMT promoter methylation” 2011 American Association of Neurological Surgeons Annual Meeting
- 2011 Symposium talk, “c-Myc modulates the dynamic transition between tumor initiating states in glioblastoma” 2011 American Association of Neurological Surgeons Annual Meeting
- 2011 Plenary talk, “Cyberknife hypofractionated stereotactic radiosurgery of large resection cavity – efficacy and safety of an 800cGy x 3 daily fractions regimen” 2011 IBMISPS Annual Meeting
- 2011 Neurosurgical Forum presentation, “A prognostic and predictive microRNA (miRNA) that down-regulate MGMT in glioblastoma”, Congress of Neurological Surgeons Annual Meeting
- 2011 Invited discussant, forum for glioblastoma therapeutic development, Accelerated Brain Cancer Cure
- 2011 Symposium talk, “microRNA in glioblastoma”, Forbeck Scholar Retreat, Forbeck Foundation
- 2011 Symposium talk, “miR-181d: a predictive glioblastoma biomarker that down regulates MGMT expression”, 16<sup>th</sup> Annual Meeting of the Society for Neuro-Oncology

- 2011 Invited grand round lecture, “Genome-wide shRNA screen for identification of novel targets in glioblastoma therapeutics”, Ohio State University Comprehensive Cancer Center
- 2011 Invited grand round lecture, “Internal shunting in the oncologic population”, Ohio State University, Department of Neurosurgery
- 2012 Lecture, “Exosomal micro-RNA as a diagnostic tool”, Exosome Diagnostics, New York
- 2012 Lecture, “Caveats of shRNA screens”, Kyowa Hakko Kirin Inc., California
- 2012 Lecture, “Radiosurgery for Neurosurgeons”, Radiosurgery Workshop, Reno, Nevada
- 2012 Lecture, “Predictive and prognostic miRNA signatures for glioblastoma”, Regulus, California
- 2012 Lecture, “MiRNA based biomarkers for therapeutic response”, Tocagen, California
- 2012 Lecture, “Spontaneous fluctuation in c-myc expression dictate capacity for tumor initiation”, Forbeck Foundation, Wisconsin
- 2012 Symposium talk, “The Bromodomain Protein Brd4 Insulates Chromatin from DNA Damage Signaling”, Society of Neuro-Oncology, Washington D. C.
- 2013 Invited presentation, “Molecular Biomarker: a Surgical Perspective”, Preuss Symposium, San Diego
- 2013 Symposium talk, “Post-transcriptional regulation of O6-methylguanine-DNA methyltransferase (MGMT) by miR-603: a step toward personalized glioblastoma treatment”, AANS/CNS 10<sup>th</sup> Biennial Satellite Tumor Symposium, New Orleans, Louisiana
- 2013 Symposium talk, “Quantitation of miRNAs in Extracellular Vesicles (Evs) Derived from Glioblastoma patients”, International Society for Extracellular Vesicles, Boston, Massachusetts
- 2013 Symposium talk, “RapidArc Radiosurgery Treatments with Surface Guided Frameless SRS”, 2013 American Association for Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2013 Symposium talk, “Surface Real-Time Image-Guided Frameless SRS: The UCSD Experience”, 2013 American Association for Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2013 Plenary talk, “Post-transcriptional Regulation of O6 Methyl-Guanine DNA Methyl Transferase (MGMT) by miR-603: A Step Toward Personalized Glioblastoma Treatment”, 2013 Bi-Annual AANS/CNS Joint Tumor Section Meeting, New Orleans, Louisiana
- 2013 Symposium talk, “Application of tractography to operative planning”, Institute of Medical Education, Chicago, Illinois
- 2013 Invited presentation, “Targeting non-oncogene addiction through PLK1 inhibition”, Forbeck Foundation, Milwaukee, Wisconsin
- 2013 Invited participant, “Improving the treatment of glioblastoma”, Invitation-only Symposium Sponsored by NCI and ABC2, Washington DC
- 2013 Invited lecture, “Difficult cases in CNS cancer”, American Society for Radiation Oncology (ASTRO) 2013 Annual Meeting, Atlanta, Georgia
- 2013 Invited lecture, “ExRNA biomarkers for human glioma”, NIH Extracellular RNA Communication Program 2013, Washington DC
- 2013 Invited commentator, “Neurosurgery innovation”, Congress of Neurological Surgeons 2013 Annual Meeting, San Francisco
- 2013 Invited lecture, “Impact of whole brain radiation therapy on neuro-cognition”, Congress of Neurological Surgeon, 2013 Annual Meeting, San Francisco
- 2013 Invited lecture, “Comparative gene signature analysis reveals differential Ras/RTK signaling by G-CIMP status in glioblastomas”, Congress of Neurological Surgeons 2013 Annual Meeting, San Francisco

- 2013 Invited lecture, “Clearpoint: Application in Neuro-Oncology”, Congress of Neurological Surgeons 2013 Annual Meeting, San Francisco
- 2013 Invited presentation, “miR-21 in the Extracellular Vesicles (Evs) of Cerebrospinal Fluid (CSF): a Platform for Glioblastoma Biomarker Development”, Congress of Neurological Surgeons 2013 Annual Meeting, San Francisco
- 2013 Invited discussant, “Resistance Mechanisms”, Forbeck Foundation, 2013, Hiltonhead
- 2013 Invited presentation, “Genome-wide shRNA screen revealed synthetic lethal interaction between Dopamine Receptor D2 (DRD2) and Epidermal Growth Factor Receptor (EGFR) inhibition in glioblastoma “, World Federation for Neuro-Oncology, 2013 Meeting, San Francisco
- 2014 Invited presentation, “Electrophysiologic monitoring in neurosurgery: opportunities for medical engineering“, 2014 Institute of Electrical and Electronic Engineers Radio& Wireless Week Annual Meeting, San Diego
- 2014 Invited presentation, “Radiosurgery for the treatment of brain”, Emerging Technologies Clinical Forum, Philadelphia, Pennsylvania
- 2014 Invited presentation, “An overview of extracellular vesicles”, Forbeck Focus Meeting, San Diego, California
- 2014 Invited presentation, “Molecular subtypes of glioblastoma”, American Association of Neurological Surgeons, San Francisco, California
- 2014 Invited presentation, “Radiosurgery with precise temporal tracking of key skull-base targets”, Radiosurgery Society 2014 Meeting, Minneapolis, Minnesota
- 2014 Invited presentation, “miRNA contents of cerebrospinal fluid extracellular vesicles in glioblastoma patients”, 2014 NIH Extracellular RNA Communication Consortium Meeting, Bethesda, Maryland
- 2014 Visiting professorship, “MRI-guided neurosurgery: Application to Neuro-Oncology”, University of California, Irvine
- 2014 Visiting professorship, “MRI-guided minimally neurosurgery”, University of Wisconsin, Madison, Department of Neurosurgery
- 2014 Invited lecture, “Dynamic epigenetic regulation of MYC expression: a hybrid model for glioblastoma tumorigenicity”, University of Wisconsin, Madison, Carbone Cancer Center
- 2014 Invited lecture, “miR-181d as a master regulator of DNA repair in glioblastoma”, Forbeck Scholar Forum, Lake Geneva, Wisconsin
- 2014 Invited lecture, “Surgical treatment of low grade gliomas”, 2014 ASTRO annual meeting
- 2014 Invited lecture, “miRNA contents of CSF extracellular vesicles (Evs) derived from glioblastoma patients, 2014 American Society for Exosomes and Microvesicles, Monterey, CA
- 2014 Invited lecture, “Laser thermal ablation through Clearpoint navigation”, Monteris, 2014 Congress of Neurological Surgeons, Boston MA
- 2014 Invited lecture, “Laser thermal ablation: applications in neuro-oncology”, 2014 Congress of Neurological Surgeons, Boston MA
- 2014 Invited presentation, “Localizing seizure-susceptible brain regions in low-grade gliomas using voxel-based lesion–symptom mapping”, 2014 Congress of Neurological Surgeons, Boston, MA
- 2014 Invited lecture, “Bypassing glioblastoma resistance to EGFR inhibitors by synthetic lethality”, 2014 CNS Anti-cancer drug discovery and development conference, Miami, FL
- 2014 Invited lecture, “Multi-orthogonal targeting of EGFRvIII expression”, 2014 Society of Neuro-Oncology Annual Meeting, Miami, FL

- 2014 Invited lecture, “Epigenetic regulation of glioblastoma tumorigenicity: a hybrid model”, 2014 Society of Neuro-Oncology Annual Meeting, Miami, FL
- 2014 Invited lecture, “Prognostic factors for SRS-treated patients with cerebral metastasis: implications on randomized control trial design and inter-institutional collaborative efforts”, 2014 Society of Neuro-Oncology Annual Meeting, Miami, FL
- 2014 Invited lecture, “Restriction Spectrum Imaging: Application in Neuro-Oncology”, Medtronic, Denver, CO
- 2015 Invited lecture, “Dynamic epigenetic regulation of glioblastoma tumorigenicity through a LSD1-MYC-OLIG2 axis”, AACR Special Conference on Myc, La Jolla, CA
- 2015 Invited lecture, “Clinical work-flow of laser thermal ablation”, Monteris Conference, La Jolla, CA
- 2015 Invited lecture, “Case review of laser thermal ablation in neuro-oncologic patients”, Monteris Conference, La Jolla, CA
- 2015 Invited lecture, “Expanded indications of intra-MRI stereotaxis”, MRI Intervention Conference, La Jolla, CA
- 2015 Invited lecture, “Laser thermal ablation for treatment of cerebral metastasis: a perspective”, Neuroblate Network Annual Meeting, Orlando, MI
- 2015 Invited lecture, “EGFR: from genomics to therapy”, Sontag Foundation, Jacksonville, MI
- 2015 Invited lecture, “Extracellular vesicles: biomarker platform for glioblastoma”, Society of Brain Mapping and Therapeutics 2015 Annual Meeting, Los Angeles, CA
- 2015 Invited lecture, “Extracellular vesicle microRNA signature as a biomarker for glioblastoma tumor burden”, Exosomes and Microvesicles as Biomarkers and Diagnostics Meeting, Boston, MA
- 2015 Session Chairman, Exosomes and Microvesicles as Biomarkers and Diagnostics, Boston, MA
- 2015 Invited lecture, “miRNA in Extracellular Vesicles (Evs) derived from cerebrospinal fluid of glioblastoma patients”, International Society for Extracellular Vesicles 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Blood-derived extracellular vesicle mRNA analysis of glioblastoma and healthy controls”, International Society for Extracellular Vesicles 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Promises and pitfalls of Extracellular Vesicles (Evs) as a glioblastoma liquid biopsy platform”, International Society for Extracellular Vesicles 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Subtype biology in glioblastoma”, American Association of Neurological Surgeons 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Orthogonal targeting of EGFRvIII expressing glioblastomas through simultaneous EGFR and PLK1 inhibition”, American Association of Neurological Surgeons 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Subventricular localization of glioblastomas by molecular subtype”, American Association of Neurological Surgeons 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Extracellular Vesicles (Evs): a novel diagnostic platform for brain cancer”, Biomarkers & Diagnostics World Congress 2015, Philadelphia, PA
- 2015 Invited lecture, “Fusion proteins as critical glioblastoma therapeutic targets”, American Association of Neurological Surgeons 2015 Annual Meeting, Washington DC
- 2015 Invited lecture, “Survival patterns of patients with cerebral metastases who underwent multiple rounds of stereotactic radiosurgery SRS”, North America Gamma Knife Society, Cleveland, Ohio

- 2015 Invited lecture, “Epigenetic regulation of glioblastoma tumorigenicity”, University of Chicago, Chicago
- 2015 Invited lecture, “Key principles of neuro-oncology: a case based approach”, University of Chicago, Chicago
- 2015 Invited lecture, “Local therapies for glioblastomas”, Practical Course, Congress of Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2015 Invited lecture, “Cumulative intracranial tumor volume thresholds for predicting survival after SRS varies by tumor histology”, Neurosurgical Forum, Congress of Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2015 Invited lecture, “Isocitrate Dehydrogenase (IDH) Mutation and Methyl-Guanine Methyl Transferase (MGMT) Promoter Methylation Status as Independent Glioblastoma Biomarkers”, Neurosurgical Forum, Congress of Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2015 Invited lecture, “LINAC radiosurgery: a neurosurgical perspective”, Noon Seminar, Congress of Neurological Surgeons Annual Meeting, New Orleans, Louisiana
- 2015 Invited lecture, “Cerebrospinal Fluid Extra-cellular Vesicle as a biomarker platform for glioblastoma”, American Society of Exosomes and Microvesicles (ASEMV) Annual Meeting, Marco Island, Florida
- 2015 Invited lecture, “Molecular determinants of tumorigenic states in glioblastoma”, The Stem Cell and Regenerative Medicine Seminar Series, City of Hope, Pasadena, California
- 2015 Invited lecture, “Management of radiosurgical resistant brain metastases and the role of LITT”, 17<sup>th</sup> Annual Brain Tumor Update, Las Vegas, Nevada
- 2015 Invited lecture, “Patients with cerebral metastases who underwent multiple rounds of stereotactic radiosurgery”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Superior efficacy of gross total resection in anaplastic astrocytoma patients relative to glioblastoma patients”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Quantitation of glioblastoma localization reveals associations with genomic subtypes and subventricular zone”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Improved survival of low-grade glioma patients (1999-2010) despite decreased utilization of radiation therapy: A SEER-based analysis”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Gross total resection is not associated with improved overall survival relative to subtotal resection in patients with anaplastic oligodendrogliomas”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Dynamic epigenetic modulation of glioblastoma tumorigenicity by inhibition of lysine-specific demethylase 1 (LSD1)”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2015 Invited lecture, “Extra-cellular miRNA as a glioblastoma biomarker platform”, Society of Neuro-Oncology 20<sup>th</sup> Annual Meeting, San Antonio, Texas
- 2016 Invited lecture, “Case review in laser thermal ablation”, Neuroblate Network Meeting, Orlando, Florida
- 2016 Invited lecture, “Dynamic Epigenetic Regulation of Glioblastoma Tumorigenicity through LSD1 Modulation of MYC Expression”, Nuclear Reprogramming and the Cancer Genome, San Diego, California

- 2016 Invited lecture, “Molecular understanding of glioblastoma Magnetic Resonance Imaging”, Sontag Foundation, Palm Springs, California
- 2016 Invited lecture, “Cerebrospinal fluid microRNA as a glioblastoma biomarker platform”, Circulating Biomarker World Congress, Boston, Massachusetts
- 2016 Invited lecture, “Management of cerebral metastasis“, Congress of Neurological Surgeon Oral Board Review, San Diego, California
- 2016 Invited lecture, “Value of surgical resection in the management of glial tumors”, Department of Neurosurgery, University of California, Irvine, California
- 2016 Invited lecture, “Principles of neuro-navigation”, Senior Neurosurgery Society Junior Resident Course, University of California, San Diego, California
- 2016 Keynote lecture, “MRI guided neurosurgery”, Association of Surgical Technologist 2016 Annual Meeting, San Diego, California
- 2016 Invited Speaker, “SRS for oligometastases & repeat oligometastases with OSMS tracking at UCSD”, the Radiation Society Annual Meeting, Orlando, Florida
- 2016 Invited lecture, “The benefit of gross total resection across glioma subtypes: a comparison of grade II/III/IV gliomas in the Surveillance, Epidemiology, and End Results (SEER) Database”, 2016 AANS/CNS Tumor Section Satellite Symposium, San Diego, California
- 2016 Invited lecture, “Diagnostic accuracy of PET, SPECT, and Arterial Spin-Labeling in differentiating tumor recurrence from necrosis in cerebral metastasis after stereotactic radiosurgery”, 2016 AANS/CNS Tumor Section Satellite Symposium, San Diego, California
- 2016 Invited lecture, “A cerebrospinal fluid microRNA signature for glioblastoma detection”, 2016 AANS/CNS Tumor Section Satellite Symposium, San Diego, California
- 2016 Invited lecture, “Emerging technologies monitoring for recurrence/progression”, 2016 AANS/CNS Tumor Section Satellite Symposium, San Diego, California
- 2016 Invited presentation, “A functional screen identifies miRs that induce radioresistance in glioblastomas”, 2016 Congress of Neurological Surgeons Annual Meeting, San Diego, California
- 2016 Invited presentation, “Comparative Prognostic Value of the Cumulative Intracranial Tumor Volume (CITV) and Score Index for Radiosurgery (SIR) in Brain Metastasis”, 2016 Congress of Neurological Surgeons Annual Meeting, San Diego, California
- 2016 Invited lecture, “CSF biomarkers for glioblastoma tumor burden”, Select Biosciences 3<sup>rd</sup> Annual Liquid Biopsies and Minimally-Invasive Diagnostics Conference, San Diego, California
- 2016 Invited lecture, “Clinical translation of EV based biomarkers: consideration for multi-platform integration”, American Society for Exosomes and Microvesicles, 2016 Annual Meeting, Asilomar, California
- 2016 Invited lecture, “Extracellular vesicles as glioblastoma biomarkers”, 2016 CDW Seminar on Exosome Biology, San Diego, California
- 2016 Invited lecture, “The Future of Departments of Neurosurgery in Academic Medical Centers”, University of Minnesota, Minneapolis, Minnesota
- 2016 Invited lecture, “Modulation of glioblastoma tumorigenicity by tumor microenvironment”, CNS Anticancer Drug Discovery and Development, Scottsdale, Arizona
- 2016 Invited lecture, “Stereotactic laser ablation (SLA) as treatment for brain metastases that recur after stereotactic radiosurgery: a multi-institutional experience”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2016 Invited lecture, “Superior prognostic value of cumulative intracranial tumor volume (CITV) relative to largest intracranial tumor volume (LITV) for stereotactic radiosurgery treated

- brain metastasis patients”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2016 Invited lecture, “Optimal radiosurgery dose for treatment of melanoma and renal cell carcinoma metastases”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2016 Invited lecture, “microRNA inhibition of endothelial DNA ANGI-09 repair capacity as a glioblastoma therapeutic strategy”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2016 Invited lecture, “microRNA inhibition of endothelial DNA ANGI-09 repair capacity as a glioblastoma therapeutic strategy”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2016 Invited lecture, “DNA repair in glioma”, Society of Neuro-Oncology 2016 Annual Meeting, Scottsdale, Arizona
- 2017 Invited lecture, “Laser thermal ablation of cerebral metastasis”, Neuroblate Network Educational Session 2017, Orlando, Florida
- 2017 Invited lecture, “Ablation of cerebral metastasis: a literature review”, Neuroblate Network Educational Session 2017, Orlando, Florida
- 2017 Invited lecture, “Stereotactic laser ablation as treatment for brain metastases that recur after stereotactic radiosurgery: value of multi-institutional collaborations”, Neuroblate Network Annual Meeting 2017, Orlando, Florida
- 2017 Invited lecture, “Microglia influence glioblastoma survival”, Sontag Foundation Retreat 2017, Jacksonville, Florida
- 2017 Invited lecture, “Inhibition of microglial PI3K $\gamma$  suppresses glioblastoma tumorigenicity by disrupting IL11-STAT3-MYC signaling”, Translational Oncology Symposium 2017, La Jolla, California
- 2017 Invited lecture, “Evolving roles of stereotaxis in neuro-oncology”, Grand Round, Massachusetts General Hospital, Boston, Massachusetts
- 2017 Invited lecture, “A cerebrospinal fluid microRNA signature as biomarker for glioblastoma”, Global Technology Community Sixth Annual Biomarker Seminar, La Jolla, California
- 2017 Invited lecture, “Surface imaging guided (SIG) radiosurgery for treatment of benign skull base tumors”, Varian Seminar on Radiosurgery, Portland, Oregon
- 2017 Invited lecture, “Glioblastoma subtype as a biomarker platform for therapeutic response”, Society for Brain Mapping and Therapeutics (SBMT) 14<sup>th</sup> Annual Conference, Los Angeles, California
- 2017 Invited lecture, “Clinical applications of laser thermal ablation in the treatment of brain metastasis”, Society for Brain Mapping and Therapeutics (SBMT) 14<sup>th</sup> Annual Conference, Los Angeles, California
- 2017 Invited lecture, “Radiographic parameterization of subventricular zone distance reveals associations with survival and gene expression in glioblastoma”, American Association of Neurological Surgeons 2017 Annual Meeting, Los Angeles, California
- 2017 Invited lecture, “Curing the incurable”, Peyton Society of Neurological Surgeons Meeting, Minneapolis, Minnesota
- 2017 Invited lecture, “IL11 secretion by glioblastoma microglia defines ‘exceptional responders’”, The American Academy of Neurological Surgery Annual Meeting, Santa Barbara, California
- 2017 Invited lecture, “Neuronal activity and glioblastoma”, Chinese American Academic & Professional Association in Minnesota, Annual Meeting, St. Paul, Minnesota

- 2017 Invited lecture, “Primary and secondary glioblastomas are driven by distinct forms of fusion oncoproteins”, Congress of Neurological Surgeons 2017 Annual Meeting, Boston, Massachusetts
- 2017 Invited lecture, “LITT for brain tumors”, Congress of Neurological Surgeons 2017 Annual Meeting, Boston, Massachusetts
- 2017 Invited lecture, “Procedural Safety of Stereotactic Laser Ablation (SLA) and Associated Hospital Stay: Outcome from the First Hundred Patient from LAANTERN Prospective Registry”, Congress of Neurological Surgeons 2017 Annual Meeting, Boston, Massachusetts
- 2017 Invited lecture, “Evolving Patterns in Clinical Utilization of Stereotactic Laser Ablation (SLA): An Analysis of the Multi-center Prospective Registry LAANTERN”, Congress of Neurological Surgeons 2017 Annual Meeting, Boston, Massachusetts
- 2017 Invited lecture, “Microglia and glioblastoma clinical response”, Massachusetts General Hospital, Boston Massachusetts
- 2017 Invited lecture, “Durable responses observed in recurrent high-grade glioma (rHGG) with Toca 511 & Toca FC treatment”, AACR-NCI-EORTC Molecular Targets and Cancer Therapeutics, Philadelphia, Pennsylvania
- 2017 Invited lecture, “LITT in the management of brain metastasis”, Symposium on Brain and Spine Metastasis, Las Vegas, Nevada
- 2017 Invited lecture, “PI3 $\gamma$  inhibition as a novel glioblastoma therapeutic paradigm”, Society of Neuro-Oncology Annual Meeting, San Francisco, California

**International Invited Presentations and Courses**

- 1998 Invited lecture, “Chromosomal rearrangements in *Saccharomyces cerevisiae rfa1* mutator mutants”, EMBO workshop on genetic recombination, Paris, France
- 2008 Invited lecture, “Clinical applications of small scale siRNA screens in cancer therapy”, Takeda Pharma, Japan
- 2008 Invited lecture, “siRNA screening for development of glioma therapy”, Astella Pharma, Japan
- 2008 Invited lecture, “Neurosurgical training in the U.S.”, National Taipei University Hospital Department of Neurosurgery, Taipei, Taiwan
- 2008 Visiting professorship, “Targeting cancer stem cells by proteasome inhibition”, Fudan University, China
- 2009 Invited lecture, “Lateral ventriculo-cisternostomy”, Chi Mei Medical Center Department of Neurosurgery, Tainan, Taiwan
- 2009 Invited lecture, “Anti-angiogenic therapy in the treatment of malignant gliomas: surgical implications”, Kaohsiung Medical University Department of Neurosurgery, Kaohsiung, Taiwan
- 2009 Invited lecture, “Proton radiosurgery in neurosurgery”, National Taipei University Hospital Department of Neurosurgery, Taipei, Taiwan
- 2009 Invited lecture, “Radiosurgery in the management of primary CNS lymphoma”, Neurological Institute of Taipei Veterans General Hospital, Taipei, Taiwan
- 2010 Invited lecture, “Neurosurgery: innovation through evolution”, Department of Neurosurgery, Kumamoto University, Kumamoto, Japan
- 2010 Invited lecture, “Update in neurosurgical oncology”, Department of Neurosurgery, Tokyo Women’s Medical University, Tokyo, Japan
- 2010 Invited lecture, “c-Myc modulates the dynamic transition between tumor initiating states in glioblastoma”, Keio University, Tokyo, Japan
- 2010 Invited lecture, “MutS and FANCM complexes function as redundant DNA damage sensors in the Fanconi Anemia pathway”, Keio University, Tokyo, Japan
- 2010 Keynote address, “History and modern application of stereotaxis”, Taiwanese Neurosurgical Society Annual meeting, Tainan, Taiwan
- 2010 Keynote address, “Novel predictive and prognostic factors in glioblastoma”, Taiwanese Neurosurgical Society Annual meeting, Tainan, Taiwan
- 2010 Invited lecture, “Oxidative stress: a lesson in non-oncogene addiction”, National Cheng Kung University, Tainan, Taiwan
- 2010 Invited lecture, “DNA repair: from bench to bedside”, National Health Research Institute, Taipei, Taiwan
- 2010 Invited lecture, “DNA repair as a platform for biomarker discovery in glioblastoma”, Academia Sinica, Taipei, Taiwan
- 2010 Invited lecture, “Biomarker discovery in glioblastoma”, Department of Neurosurgery, Beijing Tiantan Hospital, Beijing, China
- 2010 Invited lecture, “MicroRNA regulating MGMT as therapeutic strategy in glioblastoma”, Department of Neurosurgery, China West Hospital, Sichuan, China
- 2010 Visiting professorship, “Targeting cancer stem cells by proteasome inhibition”, Huashan Hospital, Shanghai, China
- 2011 Plenary talk, “Oncogene addiction and non-oncogene addiction”, Capital International Cancer Conference, Beijing, China

- 2011 Invited lecture, “Glioblastoma radiation resistance: insights from RNAi screening”, Chinese Academy of Sciences, Shanghai, China
- 2011 Surgical Grand Rounds, “Opportunities and pitfalls of clinical fellowships in the U.S.”, Chi-Mei Hospital Department of Surgery, Tainan, Taiwan
- 2011 Plenary talk, “Radiosurgery for cerebral metastasis, a fifteen year experience”, Second Annual Meeting for Stereotactic Functional Neurosurgery and Radiosurgery, Taipei, Taiwan
- 2011 Invited lecture, “Stereotactic internal shunting”, Neurological Institute of Taipei Veterans General Hospital, Taipei, Taiwan
- 2011 Invited lecture, “RNAi screening: insights into glioblastoma therapeutics”, Keio University, Tokyo, Japan
- 2011 Invited lecture, “Internal shunting in neuro-oncologic patients”, 13<sup>th</sup> Asian Australasian Congress of Neurological Surgeons, Taipei, Taiwan
- 2012 Invited lecture, “miRNA as novel glioblastoma biomarkers”, National Sun Yet-Sun University-University of California San Diego Joint Symposium, Kaohsiung, Taiwan
- 2012 Invited lecture, “Update on therapeutic advances in glioblastoma”, Chi-Mei Hospital Department of Surgery, Tainan, Taiwan
- 2012 Invited lecture, “Minimally invasive pituitary and brain tumor surgery and radiosurgery”, Aeromedevac Symposium, Guadalajara, Mexico
- 2012 Invited lecture, “Neurosurgical training in the U.S.”, Peking Union Medical Center, Beijing, China
- 2012 Invited lecture, “Radiographic features of pro-neural glioblastomas”, Tiantan Hospital, Beijing, China
- 2012 Invited lecture, “Neurosurgery-based therapeutic development”, Navy General Hospital, Beijing, China
- 2012 Invited lecture, “Novel therapeutic strategies: a neurosurgeon’s perspective”, Huashan Hospital, Shanghai, China
- 2012 Invited lecture, “CSF biomarkers in glioblastomas”, First Annual Meeting in Functional Imaging and Navigation, Shanghai, China
- 2012 Invited lecture, “Master regulating miRNAs of therapeutic resistance in glioblastomas”, Keio University, Tokyo, Japan
- 2012 Invited lecture, “New paradigms in glioblastoma biomarker development”, Tokyo Women’s Medical University – Waseda University Joint Institution for Advanced Biomedical Sciences, Tokyo, Japan
- 2012 Invited lecture, “Neurosurgical education”, Tokyo Women’s Medical University, Tokyo, Japan
- 2013 Invited lecture, “Minimally invasive neurosurgery”, Aeromed, Guadalajara, Mexico
- 2013 Invited Lecture, “Surface Real-Time Image-Guided SRS: A Precision Frameless Technique at UCSD”, 2013 International Stereotactic Radiosurgery Society (ISRS) Congress, Toronto, Canada
- 2013 Invited Lecture, “Neurosurgical Oncology: Glioblastoma Therapeutics and Diagnostics“, Department of Neurosurgery, Tokyo Women’s Medical University, Tokyo, Japan
- 2013 Invited Lecture, “An overview of neurosurgical oncology at the University of California San Diego”, Department of Neurosurgery, Taipei Veteran General Hospital, Taipei, Taiwan
- 2013 Invited Lecture, “An update on neurosurgical oncology: an UCSD experience“, Department of Neurosurgery, National Taipei University Medical Center, Taipei, Taiwan
- 2013 Invited Lecture, “A Neurosurgical approach to the developing new paradigms for glioblastoma therapy”, Department of Surgery, Chi-Mei Medical Center, Tainan, Taiwan

- 2013 Invited Lecture, “Dynamic transition in c-Myc chromatin state drives glioblastoma tumor initiating activities”, Shanghai Jiaotong University School of Medicine, Shanghai, China
- 2013 Invited Lecture, “Model derived pathway signature analysis”, Department of Neurosurgery, Hospital, Beijing, China
- 2013 Invited Lecture, “Challenging cases in skull base surgery: indications for surgical and non-surgical intervention”, Seventh Annual Meeting on Minimally Invasive Skull Base Surgery, Beijing, China
- 2013 Invited Lecture, “Overview of UCSD Neuro-oncology”, Seventh Annual Meeting on Minimally Invasive Neurosurgery, Beijing, China
- 2013 Invited Lecture, “Case based learning in neurosurgery”, Department of Neurosurgery, Peking Union Medical Center, Beijing, China
- 2014 Invited Lecture, “Glioma resection: insights into clinical benefits, publication patterns, and clinical practice”, Glioblastoma Symposium, Beijing China
- 2014 Invited lecture, “Prognostic factors for stereotactic radiosurgery treated patients with cerebral metastases”, Asian Gamma Knife Academy, Shanghai, China
- 2014 Invited lecture, “RNA contents of plasma and cerebrospinal fluid extracellular vesicles in glioblastoma patients”, International Society for Extracellular Vesicles (ISEV) 2014 Annual Meeting, Amsterdam, Netherlands
- 2014 Invited lecture, “Neurosurgical morbidity and mortality”, Taipei Medical University, Taipei, Taiwan
- 2014 Invited lecture, “Randomized clinical trial design for radiosurgery”, Taipei Veteran General Hospital, Taipei, Taiwan
- 2014 Invited lecture, “MRI-guided Neurosurgery”, National Taipei University Hospital, Taipei, Taiwan
- 2014 Invited lecture, “Opportunities in neurosurgical training”, Peking Union Medical Center, Beijing, China
- 2014 Invited lecture, “Minimally invasive neurosurgery in neuro-oncology”, Eight Annual Meeting on Minimally Invasive Neurosurgery, Beijing, China
- 2014 Invited lecture, “Selective Targeting of Inflammatory Response as a Strategy for Glioblastoma Therapy”, Merck Research Symposium, Beijing, China
- 2014 Invited lecture, “Prognostic radiographic biomarkers for glioblastoma”, Tiantan Medical Center, Beijing, China
- 2014 Invited lecture, “Clinical case based neurop-anatomy”, Peking Union Medical Center, Beijing, China
- 2015 Invited lecture, “Extracellular vesicles as a platform for glioblastoma biomarker development”, Shanghai Neurosurgery Society Annual Meeting, Shanghai, China
- 2015 Invited lecture, “Stereotactic Radiosurgery: an evolution toward efficiency and patient comfort”, Varium Edge Symposium, Beijing, China
- 2015 Invited lecture, “Clinical experiences with Surface Imaging Guided and Rapid Arc Radiosurgery: A Neurosurgical Perspective”, International Stereotactic Radiosurgery Society 2015 Annual Meeting, Yokohoma, Japan
- 2015 Invited lecture, “Cumulative Intracranial Tumor Volume (CITV) as a prognostic factor for brain metastases patients undergoing SRS”, International Stereotactic Radiosurgery Society 2015 Annual Meeting, Yokohoma, Japan
- 2015 Invited lecture, “Orthogonal targeting of EGFRvIII expressing glioblastomas through simultaneous inhibition of EGFR and PLK1”, Chi-Mei Medical Center, Tainan, Taiwan

- 2015 Invited lecture, “Dynamic epigenetic regulation of MYC expression: a hybrid model for glioblastoma tumorigenicity”, Ulsan National Institute for Science and Technology, Ulsan, Korea
- 2015 Invited lecture, “MRI-guided viral delivery and LITT for management of gliomas”, Siberian Association of Neurosurgeons, Novosibirsk, Russia
- 2015 Invited lecture, “Big data” research in glioma, Siberian Association of Neurosurgeons, Novosibirsk, Russia
- 2015 Invited lecture, “Dynamic properties of glioblastoma stem cells”, 301 PLA Army Hospital, Beijing, China
- 2015 Invited lecture, “Neurosurgical anatomy”, Peking Union Medical Center, Beijing, China
- 2015 Invited lecture, “Evidence based guideline for pituitary imaging”, Ninth Annual Meeting on Minimally Invasive Neurosurgery, Beijing, China
- 2015 Invited lecture, “Advances in neurosurgical oncology”, Hunan Tumor Center, Changsha, China
- 2015 Invited lecture, “Neurosurgical Oncology in the U.S.”, China South Medical Center, Hengyang, China
- 2015 Invited lecture, “LSD1 mediate dynamic transition between glioblastoma tumorigenic states”, Sichuan Neurosurgical Glioma Society, Chengdu, China
- 2015 Invited lecture, “Evolution of radiosurgery: towards precision, efficiency, and comfort”, Taiwanese Neurosurgical Society Annual Meeting, Taipei, Taiwan
- 2016 Invited lecture, “Molecular basis of long-term survivorship in glioblastoma”, Tiantan Medical Center, Beijing, China
- 2016 Invited lecture, “Management patterns of patients with cerebral metastases who underwent multiple stereotactic radiosurgeries”, BrainLab Radiosurgery Symposium, Sydney, Australia
- 2016 Invited lecture, “Survival patterns of patients with cerebral metastases who underwent multiple rounds of stereotactic radiosurgery SRS”, Melanoma Institute of Australia, Australia
- 2016 Invited lecture, “Evolution toward RapidArc® stereotactic radiosurgery: A neurosurgical perspective”, Australian Oncology Summit, Auckland, New Zealand
- 2016 Invited lecture, “Cerebrospinal fluid microRNA (CSF miRNA) signature as a biomarker for glioblastoma detection”, International Society for Extracellular Vesicles (ISEV) 2016 Annual Meeting, Amsterdam, Netherlands
- 2016 Invited lecture, “Microglia modulation of glioblastoma through MYC modulation”, The Centre for Cancer Research and Cell biology, Queen’s University Belfast, United Kingdom
- 2016 Invited lecture, “Advanced stereotaxis in neuro-surgical oncology”, Department of Neurosurgery, Karolinska University Hospital, Sweden
- 2016 Invited lecture, “Prognostic importance of cumulative intracranial tumor volume in brain metastasis patients treated with stereotactic radiosurgery”, Department of Neurosurgery, Karolinska University Hospital, Sweden
- 2016 Invited lecture, “Epigenetic MYC modulation and glioblastoma tumorigenicity”, Heidelberger Symposium, Moscow, Russia
- 2016 Invited lecture, “Novel applications of stereotactic neurosurgery in neuro-oncology”, School of Young Scientists, Moscow Russia
- 2016 Invited lecture, “Novel ‘liquid biopsy’ platforms for glioblastoma”, Biomarker India 2016, Bengaluru, India
- 2016 Invited lecture, “TMZ-induce miR-181d degradation: Implications on glioblastoma intra-tumoral heterogeneity and evolution of therapeutic resistance”, Indian Institute of Science, Bengaluru, India

- 2016 Invited lecture, “MGMT-regulating miRNA: A lesson in precision medicine”, 301 PLA Army Hospital, Beijing, China
- 2016 Invited lecture, “Precision surgery in Neuro-Oncology”, 301 PLA Army Hospital, Beijing, China
- 2016 Invited lecture, “Pearls and pitfall of anterior skull base surgery”, Sichuan Society of Skull Base Surgery, 2016 Annual Meeting, Chengdu, China
- 2016 Invited lecture, “Gross total resection in neuro-oncology”, National Taipei University Hospital, Taipei, Taiwan
- 2016 Invited lecture, “Glioblastoma subtype: diagnostic and therapeutic implications”, National Taipei University Hospital, Taipei, Taiwan
- 2016 Invited lecture, “Cumulative Intracranial Tumor Volume (CITV) in Radiosurgery”, Taipei Veteran General Hospital, Taipei, Taiwan
- 2016 Invited lecture, “Isocitrate Dehydrogenase (IDH) mutations: opportunities for personalizing oncologic care of glioblastoma patients”, Lihpao Life Science Corp, Taipei, Taiwan
- 2016 Invited lecture, “Value of gross total resection in glial tumors”, Chi-Mei Hospital, Tainan, Taiwan
- 2016 Invited lecture, “Precision medicine: paradigm in neuro-oncology”, 2016 Chinese Glioma Cooperative Group (CGCG) Annual Meeting, Lanzhou, China
- 2016 Invited lecture, “Laser thermal ablation in neuro-oncology”, 2016 Annual Chinese Neurosurgery Meeting, Lanzhou, China
- 2016 Invited lecture, “Deriving biologic insights into glioblastomas from neuro-imaging”, 2016 Annual Nanjing Neurosurgery Meeting, Nanjing, China
- 2016 Invited lecture, “Cumulative intracranial tumor volume as prognostic factor for treatment of brain metastasis”, 7<sup>th</sup> meeting of the Asian Gamma Knife Academy, Honolulu, Hawaii
- 2017 Invited lecture, “PI-3K $\gamma$  inhibition suppresses glioblastoma tumorigenicity through disruption of an IL11-STAT3-MYC signaling axis between microglia and glioblastoma”, World Federation of Neuro-Oncology Societies, Zurich, Switzerland
- 2017 Invited lecture, “Survival benefit associated with Gross Total Resection (GTR) in oligodendrogliomas and astrocytomas: a Surveillance, Epidemiology, and End Results Program (SEER) based analysis”, Zurich, Switzerland
- 2017 Invited lecture, “Pitfalls in surgical treatment of pituitary adenomas”, 2017 Beijing Congress of Pituitary Adenoma, Beijing, China
- 2017 Invited lecture, “Single cell analysis revealed cell-to-cell variations in physiologic state influence EV secretion”, International Society for Extracellular Vesicles (ISEV) 2017 Annual Meeting, Toronto, Canada
- 2017 Invited lecture, “In vivo characterization of EV miRNA secretion into cerebrospinal fluid (CSF) by glioblastoma”, International Society for Extracellular Vesicles (ISEV) 2017 Annual Meeting, Toronto, Canada
- 2017 Invited lecture, “Radiosurgery for Brain Metastasis”, International Society for Radiosurgery, 2017 Annual Meeting, Montreux, Switzerland
- 2017 Invited lecture, “Improving the prognostic value of disease specific graded prognostic assessment (ds-GPA) model for renal cell carcinoma by incorporation of cumulative intracranial tumor volume”, International Society for Radiosurgery, 2017 Annual Meeting, Montreux, Switzerland
- 2017 Invited lecture, “Improving the prognostic value of disease specific graded prognostic assessment (ds-GPA) model for melanoma by incorporation of cumulative intracranial tumor volume”, International Society for Radiosurgery, 2017 Annual Meeting, Montreux, Switzerland

- 2017 Invited lecture, “The role of metastasis number in the diagnosis specific graded prognostic assessment (ds-GPA) for lung, renal cell carcinoma (RCC), and melanoma”, International Society for Radiosurgery, 2017 Annual Meeting, Montreux, Switzerland
- 2017 Invited lecture, “Surface imaging guided (SIG) radiosurgery for treatment of benign skull base tumors”, International Society for Radiosurgery, 2017 Annual Meeting, Montreux, Switzerland
- 2017 Invited lecture, “Extent of Resection: When does it matter”, Beijing Tiantan International Forum of Neurosurgery, 2017 Annual Meeting, Beijing, China
- 2017 Invited lecture, “Genealogy and Journal Bias in Neurosurgery Literature”, China West Hospital, Chengdu, China
- 2017 Invited lecture, “miRNA and temozolomide resistance in glioblastoma”, Science Life Laboratory, Stockholm, Sweden
- 2017 Olivecrona lecture, “Stereotactic radiosurgery: insights and outcome”, Karolinska Hospital, Stockholm, Sweden
- 2017 Invited lecture, “Stereotactic radiosurgery as treatment for brain metastasis”, Chi Mei Hospital, Tainan, Taiwan
- 2017 Keynote lecture, “Applications of stereotaxis in modern neuro-oncology”, 8<sup>th</sup> Academic Congress of International Chinese Neurosurgical Sciences, Taipei, Taiwan

**Report of Clinical Activities and Innovations****Current Licensure and Certification**

2001-2011	Massachusetts Medical License
2011-	California Medical License

**Practice Activities**

2008-2011	Neurosurgery	Hospital	Beth Israel Deaconess Medical Center	125-150 neuro-oncology cases per year (1 OR day and 1 clinic day per week)
2008-2011	Radiosurgery	Hospital	Beth Israel Deaconess Medical Center	30-50 cases per year
2011-	Neurosurgery	Hospital	University of California, San Diego	100-150 neuro-oncology cases per year (1 OR day and 1 clinic day per week)
2011-	Neurosurgery	Hospital	University of California, San Diego	100-150 cases per year (1 OR day, 1 clinic day, ½ day for radiosurgery treatment per week)
2015-	Neurosurgery	Hospital	Veterans Affairs San Diego Healthcare System	One eighth of full-time employment

**Clinical Innovations**

Brain tumors are commonly treated with biological agents that alter MRI findings. These alterations make difficult the interpretation of radiographic abnormalities; surgical biopsies/resections of these abnormalities are often required to exclude tumor progression and treatment failure. I have conducted clinical studies to develop predictive algorithms for combining multiple advanced imaging modalities including PET, SPECT, MR perfusion, RSI, ASL, tractography, and CBF imaging to determine tumor progression. These algorithms should minimize the need for surgical intervention and improve the quality of life for patients afflicted with brain cancer.

Additionally, I have a dedicated interest in minimally invasive cranial surgery, including the application of laser thermal ablation, endoscopy, oncolytic virus delivery, tractography guided surgery, and awake craniotomy. Videos and press releases describing this work can be found through the following links.

## **Press Releases**

*Collaborations in Neurosurgery (Wall Street Journal)*

<http://online.wsj.com/article/PR-CO-20140623-903466.html>

*Skull surgery offers perils and potentials (New York Times)*

<http://www.nytimes.com/2013/07/16/science/skull-surgery-offers-perils-and-potential.html?pagewanted=all&r=0>

*DARPA Awards \$6 million to develop nanotech therapies*

[http://ucsdnews.ucsd.edu/pressrelease/darpa\\_awards\\_6\\_million\\_to\\_develop\\_nanotech\\_therapies\\_for\\_traumatic\\_brain\\_in](http://ucsdnews.ucsd.edu/pressrelease/darpa_awards_6_million_to_develop_nanotech_therapies_for_traumatic_brain_injury)

*Minimally invasive laser treatment for brain cancers (CNN)*

<http://money.cnn.com/news/newsfeeds/articles/globenewswire/10086649.htm>

*New therapeutic development for glioblastomas (World Journal – a prominent Chinese newspaper)*

<http://worldjournal.com/bookmark/25290444/article-%E6%8A%97%E7%B2%BE%E7%A5%9E%E7%97%85%E8%97%A5%E7%89%A9%E5%8F%AF%E6%B2%BB%E8%85%A6%E8%85%AB%E7%98%A4>

*Anti-psychotic Medications Offer New Hope in the Battle Against Glioblastoma*

<http://health.ucsd.edu/news/releases/Pages/2014-03-07-anti-psychotics-may-fight-glioblastoma.aspx>

*California's First MRI-Guided Laser Treatment for Brain Cancer*

<http://health.ucsd.edu/news/releases/Pages/2014-02-24-MRI-guided-brain-cancer-surgery.aspx>

*Brain Surgeons Go with the Flow*

<http://health.ucsd.edu/news/releases/Pages/2013-11-27-tractography.aspx>

*Southern California's First Real-Time MRI-Guided Gene Therapy for Brain Cancer at UC San Diego Health System*

<http://health.ucsd.edu/news/releases/Pages/2013-08-06-MRI-guided-gene-therapy-for-brain-cancer.aspx>

*MRI-Guided Biopsy for Brain Cancer Improves Diagnosis, California First*

<http://health.ucsd.edu/news/releases/Pages/2014-04-30-mri-guided-brain-biopsy-improves-diagnosis.aspx>

*Biomarker Predicts Effectiveness of Brain Cancer Treatment*

<http://health.ucsd.edu/news/releases/Pages/2014-07-01-biomarker-predicts-brain-cancer-treatment.aspx>

*Novel Technologies Advance Brain Surgery to Benefit Patients*

<http://health.ucsd.edu/news/releases/Pages/2014-07-24-novel-technologies-advance-brain-surgery.aspx>

*Patients Benefit from Complex, Minimally Invasive Neurosurgery (Bloomberg Businessweek)*

<http://investing.businessweek.com/research/markets/news/article.asp?docKey=600-201408190800PRIMZONEFULLFEED10095177-1>

*Finding Keys to Glioblastoma Therapeutic Resistance*

<http://health.ucsd.edu/news/releases/Pages/2014-08-25-keys-to-glioblastoma-resistance.aspx>

*Bio-engineered pump could carry cancer drug (UT San Diego)*

<http://www.utsandiego.com/news/2014/aug/30/pumping-cancer-drugs-schnitzer/>

*Extracellular Vesicles (EVs) as a novel biomarker platform*

<http://www.wolterskluwerhealth.com/News/Pages/'Extracellular-Vesicles'-May-Open-New-Opportunities-for-Brain-Cancer-Diagnosis-and-Treatment.aspx>

*PTPRZ-MET Fusion Protein: A New Target for Personalized Brain Cancer Treatment*

<http://health.ucsd.edu/news/releases/Pages/2014-10-13-new-target-for-glioblastoma.aspx>

*'Extracellular Vesicles' May Open New Opportunities for Brain Cancer Diagnosis and Treatment*

<http://www.wolterskluwerhealth.com/News/Pages/%27Extracellular-Vesicles%27-May-Open-New-Opportunities-for-Brain-Cancer-Diagnosis-and-Treatment.aspx>

*UCSD doctors use 3-D technology to remove brain tumors*

<http://timesofsandiego.com/education/2014/07/24/ucsd-doctors-use-3-d-technology-remove-brain-tumors/>

*San Diego Rallies Around 365ft. Rappel for Brain Cancer Research*

<http://www.utsandiego.com/news/2014/oct/30/san-diego-rallies-around-365ft-rappel-for-brain-ca/>

*UCSD Medical Researchers Discover New Fusion Protein*

<http://ucsdguardian.org/2014/10/26/ucsd-medical-researchers-discover-new-fusion-protein/>

*New Combination Treatment Strategy to “Checkmate” Glioblastoma*

[http://ucsdnews.ucsd.edu/pressrelease/new\\_combination\\_treatment\\_strategy\\_to\\_checkmate\\_glioblastoma](http://ucsdnews.ucsd.edu/pressrelease/new_combination_treatment_strategy_to_checkmate_glioblastoma)

*Spotlight on Extracellular Vesicles in Cerebrospinal Fluid*

<https://www.facebook.com/IzonScience/posts/833355260077523>

*Studies show that Rapidarc® radiosurgery is a viable, time efficient way to treat multiple brain metastases.*

<HTTP://WWW.REUTERS.COM/ARTICLE/2015/06/05/VAR-BRAIN-METASTASES-IDUSNPn773NGM+87+PRN20150605>

*CLINICAL EXPERTS REPORT ON HOW VARIAN TECHNOLOGY CAN BE USED FOR THE PRECISE, NONINVASIVE, SIMULTANEOUS TREATMENT OF MULTIPLE METASTASES IN THE BRAIN, SPINE, HEAD & NECK, AND LUNG*

<HTTP://WWW.REUTERS.COM/ARTICLE/2015/06/09/VARIAN-ISRS-CONGRESS-IDUSNPn4QYM6W+89+PRN20150609>

*Improved Survival in Adult Patients with Low-Grade Brain Tumors*

[http://ucsdnews.ucsd.edu/pressrelease/improved\\_survival\\_in\\_adult\\_patients\\_with\\_low\\_grade\\_brain\\_tumors](http://ucsdnews.ucsd.edu/pressrelease/improved_survival_in_adult_patients_with_low_grade_brain_tumors)

*Epigenetic Driver of Glioblastoma Provides New Therapeutic Target*

<http://health.ucsd.edu/news/releases/Pages/2015-07-06-glioblastoma-and-epigenetics.aspx>

*Adult Glioma Survival Improved Significantly in Past Decade*

<http://www.medscape.com/viewarticle/847504>

*Extracellular Vesicles (Including Exosomes) As Diagnostics and Prognostics*

<http://www.bioquicknews.com/node/2596>

*Neuro-oncologists seek balance between optimism, realism amid promising immunotherapy data*

<http://www.healio.com/hematology-oncology/news/print/hematology-oncology>

*A tale of two hospitals*

*GE SIGNA PULSE of MR*

<http://www.gesignapulse.com/signapulse/signapulse2014autumn?pg=42#pg42>

*Cancer that took life of Beau Biden, uncommon, but dangerous*

*The San Diego Union Tribune*

<http://www.utsandiego.com/news/2015/jun/16/beau-biden-brain-cancer/>

*Seeking Tiny Vesicles For New Medical Diagnostics*

*Chemical & Engineering News (American Chemical Society)*

<http://cen.acs.org/articles/93/i29/Seeking-Tiny-Vesicles-New-Medical.html>

*Total Resection of Brain Tumor Extends Survival*

*Medscape*

<http://www.medscape.com/viewarticle/844272>

*Laser Ablation Shows Benefit for Tumors Near the Spine*

*Medscape*

<http://www.medscape.com/viewarticle/844351>

*Medical Research Influenced by Training “Genealogy”*

[http://ucsdnews.ucsd.edu/pressrelease/medical\\_research\\_influenced\\_by\\_training\\_genealogy](http://ucsdnews.ucsd.edu/pressrelease/medical_research_influenced_by_training_genealogy)

*Neurosurgeons Evaluate Precision Laser Treatment Of Brain Tumors at UC San Diego Health*

<https://health.ucsd.edu/news/releases/Pages/2016-01-13-precision-laser-treatment-for-brain-tumors.aspx>

*Clinical Study Suggests the Origin of Glioblastoma Subtypes*

[http://ucsdnews.ucsd.edu/pressrelease/clinical\\_study\\_suggests\\_the\\_origin\\_of\\_glioblastoma\\_subtypes](http://ucsdnews.ucsd.edu/pressrelease/clinical_study_suggests_the_origin_of_glioblastoma_subtypes)

*50 Voices of the Future*

<https://ucsandiegoextension.wordpress.com/2016/10/04/50-voices-of-the-future-dr-clark-chen-on-viral-gene-therapy-and-the-treatment-of-cancer/>

*Laser thermal ablation for treatment of brain tumors*

<https://globenewswire.com/news-release/2017/04/26/972775/0/en/Monteris-Medical-Announces-New-Data-from-Clinical-Studies-Evaluating-Laser-Interstitial-Thermal-Therapy-for-Brain-Lesions.html>

*Depression Rates After Spine Surgery*

<https://www.spineuniverse.com/professional/news/depression-rates-after-spine-surgery>

*Gene Therapy Trial Led by UMN Medical School's Dr. Clark Chen Shows Promise in Treatment of Recurrent Brain Cancer*

<https://www.med.umn.edu/news-events/gene-therapy-trial-led-umn-medical-school%E2%80%99s-dr-clark-chen-shows-promise-treatment-recurrent-brain-cancer>

*New Cancer Drug Could Cure John McCain's glioblastoma using a virus*

<http://www.newsweek.com/trump-may-be-president-because-brain-cancer-694532>

*Gene therapy shows promise against brain cancer in early testing*

<http://www.philly.com/philly/health/gene-therapy-shows-promise-against-brain-cancer-in-early-testing-20171027.html>

*Top U of M Researcher, Drug Firm Collaborate to Yield Brain Cancer Progress*

<http://tcbmag.com/news/articles/2017/november/top-u-of-m-researcher-drug-firm-collaborate-to-yi>  
[Press coverage and videos accompanying press release](#)

*MRI Interventions ClearPoint® Neuro Navigation System Utilized for the First Time in Minnesota*

<https://globenewswire.com/news-release/2018/01/03/1281602/0/en/MRI-Interventions-ClearPoint-Neuro-Navigation-System-Utilized-for-the-First-Time-in-Minnesota.html>

*Dr. Clark Chen Performs Brain Surgery Utilizing Cutting-Edge MRI Navigation Platform*

<https://www.med.umn.edu/news-events/umn-medical-school%E2%80%99s-dr-clark-chen-performs-minnesota%E2%80%99s-first-brain-tumor-surgery-utilizing-cutting-edge-mri-navigation-platform>

*Breakthrough Surgery Uses Laser To Remove Brain Tumor*

<http://minnesota.cbslocal.com/video/3789439-breakthrough-surgery-uses-laser-to-remove-brain-tumor/>

*Hibbing man revels in results of a brain surgery never-before performed in Minnesota*

<http://www.duluthnewstribune.com/news/4386775-hibbing-man-revels-results-brain-surgery-never-performed-minnesota>

*New brain surgery option less invasive (Star Tribune)*

<https://www.pressreader.com/usa/star-tribune/20180114/283798559159327>

*Minimally invasive procedure gives brain tumor patient another chance at a health life*

<https://www.mhealth.org/blog/2018/january-2018/minimally-invasive-procedure-gives-brain-tumor-patient-another-chance-at-a-healthy-life>

### **Videos and articles accompanying press releases**

*Gene therapy for brain cancer*

UCSD: <https://www.youtube.com/watch?v=xApelgAoVc>

KPBS: <http://www.youtube.com/watch?v=c5bDgzhP2Fc>

ABC: <http://on.aol.com/video/attacking-glioblastoma-brain-cancer-with-a-virus-518161528>

*Hoffingtonpost:* <http://videos.huffingtonpost.com/voces/attacking-glioblastoma-brain-cancer-with-a-virus-518161528>

*NBC:* <https://www.youtube.com/watch?v=lfFMYzfRznk>

*MRI-guided brain biopsy*

[https://www.youtube.com/watch?v=hALKyJL9e\\_c](https://www.youtube.com/watch?v=hALKyJL9e_c)

*MRI-guided laser surgery for brain cancer*

<https://www.youtube.com/watch?v=Vet3ZJlfLJ0>

*Cell phone and brain cancer*

*FOX:* [https://www.youtube.com/watch?v=-50eTf\\_Hb9U](https://www.youtube.com/watch?v=-50eTf_Hb9U)

*Brain tumor and behavior*

*FOX:* <https://www.youtube.com/watch?v=Lr-KNVrSZPs>

*Tractography guided neurosurgery*

<https://www.youtube.com/watch?v=UhUgCxU0x1I>

*Brain cancer responds to anti-psychotic meds*

<http://www.ziptrials.us/cancer-studies/brain-cancer-responds-to-anti-psychotic-meds/>

*UCSD surgeon uses unique 3-D tools during brain surgery*

*KPBS (2 part series):*

[http://www.kpbs.org/news/2014/aug/05/groundbreaking-imaging-tools-advance-brain-surgery/?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+kpbs%2Flocal+\(KPB+S+News%3A+Local+Headlines\)](http://www.kpbs.org/news/2014/aug/05/groundbreaking-imaging-tools-advance-brain-surgery/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+kpbs%2Flocal+(KPB+S+News%3A+Local+Headlines))

[http://www.kpbs.org/news/2014/aug/06/ucsd-surgeon-uses-cutting-edge-imaging-tools-guide/?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+kpbs%2Fhealth+\(KPB+S+News%3A+Health\)](http://www.kpbs.org/news/2014/aug/06/ucsd-surgeon-uses-cutting-edge-imaging-tools-guide/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+kpbs%2Fhealth+(KPB+S+News%3A+Health))

*Minimally invasive neurosurgery offer new hopes for brain tumor patients*

*ESPN:* <http://youtu.be/K-PPwNW2QIY>

*Minimally invasive brain surgery advanced at UC San Diego Health System*

<https://www.youtube.com/watch?v=arJbjOjx2Dc>

*Brain Tumors, Tractography, and Surgery in the MRI*

*UCTV:* <http://www.ucsd.tv/search-details.aspx?showID=28395>

*Minimally invasive biomarker for brain tumor detection*

*ABC2:* <http://abc2.org/article/san-diego-brain-cancer-experts-partner-industry-research-early-tumor-recurrence-detection>

*First Real-time MRI-guided Brain Surgery for Parkinson's in Southern California*

<http://health.ucsd.edu/news/releases/Pages/2014-12-16-mri-guided-dbs-surgery.aspx>

*Treating recurrent glioma with Toca511*

<http://cancerdiscovery.aacrjournals.org/content/early/2017/11/07/2159-8290.CD-NB2017-157>

## **Interviews**

*Accelerated Brain Cancer Cure:*

<https://www.youtube.com/watch?v=QMr9FOqnKmE>

<https://www.youtube.com/watch?v=YLcYrtLgzEE>

*Accelerated Brain Cancer Cure:*

<https://www.youtube.com/watch?v=b9E9amfKrEQ>

*Whole brain radiation therapy and neurocognitive assessment*

<https://soundcloud.com/bmjpodcasts/radiation-for-brain-metastases>

*Concepts in glioblastoma therapy*

<http://elo-cdn.podcasts.bmj.com/themes/jnnp/mp3/warnke-chen.mp3>

*MRI-guided stereotactic brain biopsy*

[Practical Neurology](#)

*Go with the flow*

*UCSD Discoveries*

<http://health.ucsd.edu/flip-books/discoveries/2014/index.html>

*Taiwan Outlook interview*

[https://www.youtube.com/watch?v=FvJpgtVukBI&index=1&list=PL1jgDkmVYB7b1YCaUsu7b6SlH6i1S0V\\_1](https://www.youtube.com/watch?v=FvJpgtVukBI&index=1&list=PL1jgDkmVYB7b1YCaUsu7b6SlH6i1S0V_1)

*Neurosurgery Focus*

<https://vimeo.com/user16212450/review/182601977/6e4924613b>

*Association of Surgical Technologists*

<https://vimeo.com/187724623>

## **Report of Technological and Other Scientific Innovations**

### Laboratory Interest

Glioblastoma is the most common form of adult brain cancer. Integrated genomic analyses of glioblastoma specimens are beginning to unveil insights into the native tumor physiology of as it exists within the human brain. My laboratory has focused on developing comprehensive tools synthesize these insights with our mechanistic understanding of the fundamental biologic processes, such as DNA replication, repair, and mitosis, to identify novel therapeutic and diagnostic platforms. By coupling integrate genomic analysis with curated clinical data, we have identified the predictive biomarkers for glioblastoma response to chemotherapy, including select microRNAs. Characterization of these microRNA suggest the critical importance DNA repair. Ongoing effort are directed toward dissecting the repair network that mediate clinical glioblastoma response to chemotherapy and deriving novel therapeutic paradigms based on this understanding.

Paralleling these efforts, we have carried out genome scale RNAi screens to systematically evaluate genes required for glioblastoma proliferation. Hybridizing these results with genomic mutational landscape and statistically rigorous interrogation of glioblastoma transcriptome profiles have led to the identification of a number of novel therapeutic targets including the G-Protein Coupled Receptor (GPCR) Dopamine Receptor 2 (DRD2), the mitosis regulating kinase, Polo-Like Kinase 1 (PLK1), and the metabolic enzyme, Lactate Dehydrogenase (LDHA) uncovered systems level cross talk between molecular network mediating , metabolism, and chromatin structure.

Taken together, our studies suggest that combining molecular genetic/cell biologic approaches with integrative cancer genome analysis constitutes a powerful platform toward diagnostic and therapeutic development. However, this approach fundamentally neglects the interactions between the tumor and its microenvironment. To overcome this limitation, we performed studies to examine how glioblastoma biology is altered by the presence of micro-glia and bone marrow cell, both present in the glioblastoma micro-environment. The emerging picture is a reciprocal dynamic synergism whereby the glioblastoma cells express specific cell surface molecules to suppress the immunologic function of microglia and the microglia/bone marrow cells secrete select cytokines to stimulate glioblastma growth. Importantly, significant portions of this dynamic interaction are mediated through secreted microvesicles, suggesting these platforms as a viable platform for diagnostic and therapeutic development.

## **Report of Scholarship**

### **PEER REVIEWED PUBLICATIONS, Original Articles**

- 1) Bass DM, Baylor MR, **Chen CC**, Machkow EM, Bremont M, Greenberg HB. Liposome mediated transfection of intact viral particles reveal that plasma membrane penetration determines permissivity of tissue culture cells to rotavirus. *J Clin Invest* 1992; 90:2313-2320.
- 2) **Chen CC**, Baylor MR, Bass DM. Murine intestinal mucins inhibit rotavirus infection. *Gastroenterology* 1993; 105(1):84-92.
- 3) Bass DM, Baylor MR, **Chen CC**, Upadhyayula U. Dansylcadaverine and cytochalasin D enhance rotavirus infection of murine L cells. *Virology* 1995; 212:429-437.
- 4) **Chen CC**, Neugut AI, Rotterdam H. Risk factors for adenocarcinomas and malignant carcinoids of the small intestine: Preliminary Findings. *Cancer Epidemiol Biomarkers Prev* 1994; 3:1-3.
- 5) Chow JS, **Chen CC**, Ahsan H, Neugut AI. A population based study of the incidence of malignant small bowel tumors: SEER 1973-1990. *Int J Epidemiol* 1996; 25:722-728.
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- 7) Lin Y-L, **Chen CC**, Keshav KF, Winchester E, Dutta A. Dissection of the functional domains of the human DNA replication protein complex Replication Protein A. *J Biol Chem* 1996; 271:17190-17198.
- 8) Lin Y-L, Shivji MK, **Chen CC**, Kolodner RD, Wood RD, Dutta, A. The evolutionarily conserved zinc finger motif in the largest sub-unit of human RPA is required for DNA replication and mismatch repair but not nucleotide excision repair. *J Biol Chem* 1998; 273:1453-1461.
- 9) Umezu K, Sugawara N, **Chen CC**, Haber JE, Kolodner R. Genetic analysis of *Saccharomyces cerevisiae* *RPA1* reveals multiple functions in DNA metabolism. *Genetics* 1998; 148:989-1005.
- 10) **Chen CC**, Umezu K, Kolodner RD. Chromosomal rearrangements occur in *Saccharomyces cerevisiae* *rfa1* mutator mutants due to mutagenic lesions processed by different double-strand-break repair pathways. *Mol Cell* 1998; 2:9-22.
- 11) **Chen CC**, Merrill BJ, Lau P, Holm C, Kolodner RD. *Saccharomyces cerevisiae* *pol30* (PCNA) mutations impair replication fidelity and mismatch repair. *Mol Cell Biol* 1999; 19:7801-7815.
- 12) **Chen CC**, Kolodner RD. Gross chromosomal rearrangements in *Saccharomyces cerevisiae* replication and recombination defective mutants. *Nat Genet* 1999; 23:81-85.
- 13) Myung K, Dutta A, **Chen CC**, Kolodner RD. SGS1, the *Saccharomyces cerevisiae* homologue of BLM and WRN, suppresses genome instability and homeologous recombination. *Nat Genet* 2001; 27:113-116.

- 14) Myung K, **Chen CC**, Kolodner RD. Multiple pathways cooperate in the suppression of genome instability in *Saccharomyces cerevisiae*. *Nature* 2001; 411:1073-1076.
- 15) **Chen CC**, Bellon RJ, Ogilvy CS, Putman CM. Aneurysms of the lateral spinal artery. *Neurosurgery* 2001; 48:949-954.
- 16) **Chen CC**, Hsu L, Hecht, JL, Janecka I. Bimaxillary chondrosarcoma: clinical, radiologic, and histologic correlation. *Am J Neuroradiol* 2002; 23:667-670.
- 17) **Chen CC**, Motegi A, Hasegawa Y, Myung K, Kolodner RD, D'Andrea A. Genetic analysis of ionizing radiation induced-mutagenesis in *Saccharomyces cerevisiae* reveals TransLesion Synthesis (TLS) independent of PCNA K164 SUMOylation and ubiquitination, *DNA Repair* 2006; 5:1475-1488.
- 18) **Chen CC**, Taniguchi T, D'Andrea A. The Fanconi Anemia (FA) pathway confers cellular resistance to the DNA alkylating agents, *J Mol Med* 2007; 85:497-509.
- 19) Kennedy RD, **Chen CC**, Stuckert P, Archila EM, De la Vega MA, Moreau L, Shimamura A, D'Andrea A. Fanconi anemia pathway deficient tumor cells are hypersensitive to inhibition of ataxia telangiectasia mutated. *J Clin Invest* 2007; 117:1440-1449.
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- 21) Ng K, Nitta M, Hu L, Kesari S, D'Andrea A, **Chen CC**. A siRNA screen revealed proteasome inhibition as strategy for glioblastoma therapy. *Clin Neurosurg* 2009; 56: 107-18.
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- 23) **Chen CC**, Zinn PO, Kasper EM, Ogilvy CS. Cranio-spinal migration of a metallic clip placed during arteriovenous malformation resection – A case report, review of the literature, and management strategies. *BMC Neurology* 2010; 10: 109-112.
- 24) Kasper EM, Leudi MM, Zinn PO, Rubin P, **Chen CC**. Retained trans-orbital foreign body with intracranial extension after pipe bomb explosion, a case report. *Surg Neurol Int* 2010; 1:94.
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- 26) Kao WH, Riker AI, Kushwaha DS, Ng K, Enkemann SA, Jove R, Buettner R, Zinn PO, Sánchez NP, Villa JL, D'Andrea AD, Sánchez JL, Kennedy RD, Matta JL\*, **Chen CC\***. Upregulation of Fanconi Anemia DNA Repair Genes in Melanoma Compared to Non-Melanoma Skin Cancer. *Journal of Invest Derm* 2011; 1-3. \*equal contribution as senior authors.

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- 30) Mahadevan A, Floyd S, Wong E, **Chen CC**, Kasper E. Neurological Outcome After Hypofractionated Stereotactic Radiotherapy (HSRT) for Benign Skull Base Tumors. *Computer Aided Surgery* 2011; 16: 112-20.
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- 24) **Chen CC**. podcast “Gross Total Resection Outcomes in the Elderly Glioblastoma Population: A SEER-based Analysis. Journal of Neurosurgery, 2013.
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- 27) **Chen CC**. comments “Net Clinical Benefit Analysis of Radiation Therapy Oncology Group 0525: A Phase III Trial Comparing Conventional Adjuvant Temozolomide With Dose Intensive Temozolomide in Patients With Newly Diagnosed Glioblastoma.” Congress of Neurological Surgeons, Neurosurgery Watch, 2013.
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- 35) **Chen CC**, Depp C, Wilson B, Bartek J, Carter BS. A pilot study of physician personal preferences for treatment of glioblastoma. Acta Neurochir. 158(10): 1933.
- 36) **Chen CC**. MRI –guided biopsy and laser ablation of a difficult-to-access brain tumor. University of Minnesota Consult 2018, 5(1), 3.

**Professional Educational Materials or Reports**

1996-7	Harvard Medical School Pharmacology course, course supplement	in house publishing for course	First year medical students
2004-5	Harvard Medical School Neuroanatomy course, course supplement	in house publishing for course	Second year medical students
2008-	Beth Israel Deaconess Medical Center Neurosurgery Rotation, course curriculum	In house publishing for course	Third year medical students
2009	Beth Israel Deaconess Medical Center, Needham Campus, Continuing Medical Education “Emerging evidence in the treatment of brain cancer”	Course material for CME	Medical Staff
2009	Jordan Hospital, Department of Medicine, MA, Continuing Medical Education “Management of brain cancer”	Course material for CME	Medical Staff
2009	Cambridge Hospital, Department of Medicine, MA, Continuing Medical Education “Non-invasive and minimally invasive neurosurgery”	Course material for CME	Medical Staff
2009	St. Anne’s Hospital, Department of Medicine, MA, Continuing Medical Education “Brain metastasis: disease of the upcoming century”	Course material for CME	Medical Staff
2009	Course curriculum for Harvard Medical School clerkships in Neurosurgery (SU509M.5), Evidence based neurosurgery (SU524M.5), and Neurosurgical Oncology (SU515M.5)	Course material	Third and fourth year medical student
2012	Course curriculum for University of California, San Diego School Clerkships: Introduction to Neurosurgery (Surg-410), Surgical sub-specialty (Surg-401A), and Neurological Surgery (Surg-454)	Course material	Third and fourth year medical student
2013	Course curriculum for University of California, San Diego Medical School Elective	Course material	First and second year medical student
2013	Course curriculum, University of California, San Diego Medical School, Radiation Oncology Department Learning Center “Stereotactic	Webnar and course material	Radiation oncologists and physician assistnats

	Radiosurgery: An evolution toward comfort and efficiency”		
2014	Course curriculum, University of California, San Diego Medical School, Introduction to Neurosurgery (NEU224)	Course material	First year medical students
2014	Forbeck Focus Meeting Report	Forbeck Foundation	Foundation Newsletter
2015	Course curriculum, University of California, San Diego Medical School, Introduction to Neurosurgery (NEU226)	Course material	Second year medical students
2016	Course curriculum, University of California, San Diego Medical School, (Surg401A)	Course material	Third year medical students
2017	Webinar, International Society for Radiosurgery	Webinar presentation	CME for radiosurgery practitioners

**Theses**

**Chen CC.** Replication Accessory Factors and Genome Stability [Ph.D. dissertation]. Massachusetts (MA): Harvard Medical School; 1999.

**Chen CC.** *Saccharomyces cerevisiae* *SGS1* Suppress Homeologous Recombination, Non-Homologous Recombination and Telomeric addition [Medical School Honors dissertation]. Massachusetts (MA): Harvard Medical School; 2001.