

Curriculum Vitae for Academic Promotion
The Johns Hopkins University School of Medicine



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Chetan Bettegowda, MD PhD

DEMOGRAPHIC INFORMATION

Current Appointments

2006-2012 Resident, Neurosurgery, The Johns Hopkins Hospital
2011-2012 Chief Resident, Neurosurgery, The Johns Hopkins Hospital
2012-2016 Assistant Professor of Neurosurgery Oncology and Radiation Oncology, The Johns Hopkins Hospital
2016-Current Associate Professor of Neurosurgery, Oncology and Radiation Oncology, The Johns Hopkins Hospital

Personal Data

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Education and Training

Undergraduate

1998 B.S., Biology & Religion (Double Major), Duke University, Durham, NC

Doctoral/Graduate

2005 M.D., Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD
2005 Ph.D., Cellular and Molecular Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD

Postdoctoral

2005-06 Intern, General Surgery, The Johns Hopkins Hospital, Baltimore, MD
2006-2012 Resident, Neurosurgery, The Johns Hopkins Hospital, Baltimore, MD
2009-11 Research Fellow, Neuro-oncology, The Johns Hopkins University School of Medicine

Professional Experience

2012 Assistant Professor of Neurosurgery and Oncology
The Johns Hopkins University School of Medicine

PUBLICATIONS

H-Index: 29

Peer Reviewed Original Science Publications

1. Levin ED, **Bettegowda C**, Weaver T, Christopher NC. Nicotine-dizocilpine interactions and working and reference memory performance of rats in the radial-arm maze. *Pharmacol Biochem Behav.* 1998 Nov. 61; 3.
2. Levin ED, **Bettegowda C**, Blosser J, Gordon J. AR-R17779, and alpha7 nicotinic agonist, improves learning and memory in rats. *Behav Pharmacology.* 1999 Nov. 10; 6

3. Dang LH, **Bettegowda C**, Huso DL, Kinzler KW, Vogelstein B. Combination bacteriolytic therapy for the treatment of experimental tumors. *PNAS* 2001 Dec. 18; 98
4. **Bettegowda C**, Dang LH, Abrams R, Huso DL, Dillehay L, Cheong I, Agrawal N, Borzillary S, McCaffery JM, Watson EL, Lin KS, Bunz F, Baidoo K, Pomper MG, Kinzler KW, Vogelstein B, Zhou S. Overcoming the hypoxic barrier to radiation therapy with anaerobic bacteria. *PNAS*. 2003 Dec. 9; 100
Traverso G, **Bettegowda C**, Kraus J, Speicher MR, Kinzler KW, Vogelstein B, Lengauer C. Hyper-recombination and genetic instability in BLM-deficient epithelial cells. *Cancer Research*. 2003Dec. 5;63
5. Dang LH*, **Bettegowda C***, Agrawal N, Cheong I, Huso D, Frost P, Loganzo F, Greenberger L, Barkoczy J, Pettit GR, Smith AB 3rd, Gurulingappa H, Khan S, Parmigiani G, Kinzler KW, Zhou S, Vogelstein B. Targeting vascular and avascular compartments of tumors with *C. novyi-NT* and Anti-Microtubule Agents. *Cancer Biology and Therapeutics*. 2004 March; 3 (cover article, co-first authors)
6. Agrawal N, **Bettegowda C**, Cheong I, Geschwind JF, Drake CG, Hipkiss EL, Tatsumi M, Dang LH, Diaz LA Jr, Pomper M, Abusedera M, Wahl RL, Kinzler KW, Zhou S, Huso DL, Vogelstein B. Bacteriolytic therapy can generate a potent immune response against experimental tumors. *PNAS* 2004 Oct. 19; 101
7. **Bettegowda C**, Foss CA, Cheong I, Wang Y, Diaz L, Agrawal N, Fox J, Dick J, Dang LH, Zhou S, Kinzler KW, Vogelstein B, Pomper MG. Imaging bacteriolytic therapy with I-125 FIAU. *PNAS* 2005 Jan. 25; 102
8. Diaz LA Jr, Cheong I, Foss CA, Zhang X, Peters BA, Agrawal N, **Bettegowda C**, Karim B, Liu G, Khan K, Huang X, Kohli M, Dang LH, Hwang P, Vogelstein A, Garrett-Mayer E, Kobrin B, Pomper M, Zhou S, Kinzler KW, Vogelstein B, Huso DL. Pharmacologic and toxicologic evaluation of *C. novyi-NT* spores. *Toxicol Sci*. 2005 Dec.; 88
9. **Bettegowda C**, Huang X, Lin J, Cheong I, Kohli M, Szabo SA, Zhang X, Diaz LA Jr, Velculescu VE, Parmigiani G, Kinzler KW, Vogelstein B, Zhou S. The genome and transcriptomes of the anti-tumor agent *Clostridium novyi-NT*. *Nature Biotechnology* 2006 Dec. 24;12
10. Cheong I, Huang X, **Bettegowda C**, Diaz LA Jr, Kinzler KW, Zhou S, Vogelstein B. A bacterial protein enhances the release and efficacy of liposomal cancer drugs. *Science* 2006 Nov. 24; 314
11. Plomp M, McCaffery JM, Cheong I, Huang X, **Bettegowda C**, Kinzler KW, Zhou S, Vogelstein B, Malkin AJ. Spore coat architecture of *Clostridium novyi NT* spores. *J Bacteriology* 2007 Sep; 189
12. Diaz LA Jr, Foss CA, Thornton K, Nimmagadda S, Endres CJ, Uzuner O, Seyler TM, Ulrich SD, Conway J, **Bettegowda C**, Agrawal N, Cheong I, Zhang X, Ladenson PW, Vogelstein BN, Mont MA, Zhou S, Kinzler KW, Vogelstein B, Pomper MG. Imaging of Musculoskeletal Bacterial Infections by [I] FIAU-PET/CT. *PLoS ONE*. 2007 Oct 10;2
13. Farrag TY, Agrawal N, Sheth S, **Bettegowda C**, Ewertz M, Kim M, Tufano RP. Algorithm for safe and effective reoperative thyroid bed surgery for recurrent/persistent papillary thyroid carcinoma. *Head and Neck* 2007 Dec 29;12
14. Mehta V, **Bettegowda C**, Amin A, El-Gassim M, Jallo GI, Ahn E. Impact of tethered cord release on symptoms of Chiari II malformation in children born with a myelomeningocele. *Childs Nerv Syst*. 2010 Oct 5.
15. Mehta V, **Bettegowda C**, Ahmadi SA, Berenberg P, Thomale UW, Haberl EJ, Jallo GI, Ahn E. Spinal Cord Tethering after Myelomeningocele Repair. *J Neurosurg Pediatr*. 2010 November 6.
16. Mehta V, **Bettegowda C**, Jallo GI, Ahn E. The Evolution of Surgical Management for Craniosynostosis. *Neurosurg Focus* 2010 December 29.
17. Parsons DW, Li M, Zhang X, Jones S, Leary RJ, Lin JC, Boca SM, Carter H, Samayoa J, **Bettegowda C**, Gallia GL, Jallo GI, Binder ZA, Nikolsky Y, Hartigan J, Smith DR, Gerhard DS, Fults DW, Vandenberg S, Berger MS, Marie SK, Shinjo SM, Clara C, Phillips PC, Minturn JE, Biegel JA, Judkins AR, Resnick AC, Storm PB, Curran T, He Y, Rasheed BA, Friedman HS, Keir ST, McLendon R, Northcott PA, Taylor MD, Burger PC, Riggins GJ, Karchin R, Parmigiani G, Bigner DD, Yan H, Papadopoulos N, Vogelstein B, Kinzler KW, Velculescu VE. The Genetic Landscape of the Childhood Cancer Medulloblastoma. *Science*. 2010 Dec 16.
18. **Bettegowda C**, Shajari M, Suk I, Simmons O, Gokaslan Z, Wolinsky JP. Sublabial Approach for the Treatment of Symptomatic Basilar Impression in a Patient with Klippel-Feil Syndrome: A Case Report. *Neurosurgery (cover article)*. 2011 March 15.
19. Heaphy CM, de Wilde RF, Jiao Y, Klein AP, Edil BH, Shi C, **Bettegowda C**, Rodriguez FJ, Eberhart CG, Hebbbar S, Offerhaus GJ, McLendon R, Rasheed BA, He Y, Yan H, Bigner DD, Oba-Shinjo SM, Marie SK, Riggins GJ, Kinzler KW, Vogelstein B, Hruban RH, Maitra A, Papadopoulos N, Meeker AK. Altered Telomeres in Tumors with *ATRX* and *DAXX* Mutations *Science*. 2011 Jul 22;333(6041):425

20. Agrawal N*, Frederick MJ*, Pickering CR*, **Bettegowda C***, Chang K, Li RJ, Fakhry C, Xie TX, Zhang J, Wang J, Zhang N, El-Naggar AK, Jasser SA, Weinstein JN, Treviño L, Drummond JA, Muzny DM, Wu Y, Wood LD, Hruban RH, Westra WH, Koch WM, Califano JA, Gibbs RA, Sidransky D, Vogelstein B, Velculescu VE, Papadopoulos N, Wheeler DA, Kinzler KW, Myers JN. Exome Sequencing of Head and Neck Squamous Cell Carcinomas Reveals Inactivating Mutations in *NOTCH1*. *Science*. 2011 Aug 26;333(6046):1154-7 (co-first author)
21. **Bettegowda C**, Agrawal N, Jiao Y, Sausen M, Wood LD, Hruban RH, Rodriguez FJ, Cahill DP, McLendon R, Riggins G, Velculescu VE, Oba-Shinjo SM, Marie SK, Vogelstein B, Bigner D, Yan H, Papadopoulos N, Kinzler KW. Mutations in CIC and FUBP1 Contribute to Human Oligodendroglioma. *Science*. 2011 August 4.
22. Woodworth GF, See A, **Bettegowda C**, Batra S, Jallo GI, Rigamonti D. Predictors of Surgery-Free Outcome in Adult Endoscopic Third Ventriculostomy. *World Neurosurg*. 2011 Nov 7
23. Ononiwu C, Mehta V, **Bettegowda C**, Jallo G. Pediatric Spinal Glioblastoma Multiforme: Current Treatment Strategies and Possible Predictors of Survival. *Childs Nerv System* 2012 Feb 4.
24. Wolf, A, Batra, S, Bortoletto, S, **Bettegowda, C**, Amendola, B, Blach, L, Kleinberg, L, Rigamonti, D. Stereotactic radiosurgery of colorectal carcinoma brain metastasis: a multi-institutional experience. (2012); *Cureus* 4(5) e: 46.
25. Wolf, A, Stall, B, Batra, S, Bortoletto, S, **Bettegowda, C**, Coy, C.R, Amendola, B, Blach, L, Kleinberg, L, Rigamonti, D. Gamma knife radiosurgery for melanoma brain metastases. (2012); *Cureus* 4(5) e: 4
26. Wolf, A, Redmond, J.K, Bortoletto, S, Batra, S, **Bettegowda, C**, Amendola, B, Blach, L, Kleinberg, L, Rigamonti, D. Gamma knife radiosurgery for breast cancer metastases to the brain: outcomes and prognostic factors from a large prospectively collected database. (2012); *Cureus* 4(5): e: 43.
27. Wolf, A, Batra, S, Bortoletto, S, **Bettegowda, C**, Amendola, B, Blach, L, Kleinberg, L, Rigamonti, D. Stereotactic radiosurgery for the treatment of brain metastases from non-small cell lung carcinoma: a multi-institutional experience. (2012); *Cureus* 4 (4) e: 41.
28. Husain H, Savage W, Grossman S, Ye X, Burger P, Everett, **Bettegowda C**, Diaz L, Blair C, Romans K, Holdhoff M. Pre-and Post-Operative Plasma Glial Fibrillary Acidic Protein Levels in Patients with Newly Diagnosed Gliomas. *Journal of Neuro-Oncology* 2012 Aug.
29. Jain A, Amin A, Jain P, Burger P, Jallo GI, Lim M, , **Bettegowda C**. Subependymoma: Clinical Features and Surgical Outcomes. *Neurological Research*. 12 September 2012.
30. Jiao Y, Killela PJ, Reitman ZJ, Rasheed AB, Heaphy CM, de Wilde RF, Rodriguez FJ, Rosemberg S, Oba-Shinjo SM, Marie SK, **Bettegowda C**, Agrawal N, Lipp E, Pirozzi C, Lopez G, He Y, Friedman H, Friedman AH, Riggins GJ, Holdhoff M, Burger P, McLendon R, Bigner DD, Vogelstein BK, Meeke AK, Kinzler KW, Papadopoulos N, Diaz LA, Yan H. Frequent ATRX, CIC and FUBP1 mutations refine the classification of malignant gliomas. *Oncotarget* 3 Aug. 2012.
31. Agrawal N*, Jiao Y*, **Bettegowda C***, Hutfless, Wang Y, David S, Cheng Y, Twaddell W, Latt N, Shin E, Wang L, Wang LD, Ding I, Yang W, Velculescu V, Vogelstein B, Papadopoulos N, Kinzler K, Meltzer S. Comparative genomic analysis of esophageal adenocarcinoma and squamous cell carcinoma. *Cancer Discovery* 2 October 2012 (co-first author).
32. **Bettegowda C**, Adogwa O, Mehta V, Chaichana K, Weingart J, Carson B, Jallo GI, Ahn E. Treatment of Choroid Plexus Tumors: A Twenty Year Single Institutional Experience. *Journal of Neurosurgery:Pediatrics* 10 November 2012.
33. Agrawal N, Jiao Y, Sausen M, Leary R, **Bettegowda C**, Roberts N, Bhan S, Ho A, Khan Z, Bishop J, Westra W, Wood L, Hruban R, Tufano R, Robinson B, Drale H, Toledo S, Toledo R, Morris L, Ghossein R, Fagin J, Chan T, Velculescu V, Vogelstein B, Kinzler K, Papadopoulos N, Nelkin B, Ball D. Exomic sequencing of medullary thyroid cancer reveals dominant and mutually exclusive oncogenic mutations in RET and RAS. *Journal of Clinical Endocrinology and Metabolism*. February 2013.
34. Kinde I*, **Bettegowda C***, Wang Y*, Wu J, Agrawal N, Shih IeM, Kurman R, Dao F, Levine DA, Giuntoli R, Roden R, Eshleman JR, Carvalho JP, Marie SK, Papadopoulos N, Kinzler KW, Vogelstein B, Diaz LA Jr. Evaluation of DNA from the Papanicolaou Test to Detect Ovarian and Endometrial Cancers. *Sci Translational Medicine*. 9 January 2013. (co-first author).
35. **Bettegowda C**, Agrawal N, Jiao Y, Wang Y, Wood L, Rodriguez FJ, Hruban RH, Gallia GL, Binder ZA, Riggins CJ, Salmasi V, Riggins GJ, Reitman ZJ, Rasheed A, Keir S, Shinjo S, Marie S, McLendon R, Jallo G, Vogelstein B, Bigner D, Yan H, Kinzler KW, Papadopoulos N. Exomic Sequencing of Four Rare Central Nervous System Tumor Types. *Oncotarget* 6 April 2013

36. Killela PJ*, Reitman ZJ*, Jiao Y*, **Bettegowda C***, Agrawal N, Diaz LA, Friedman A, Friedman H, Gallia GL, Giovannella BV, Grollman AP, He TC, He Y, Hruban RH, Jallo GI, Meeker AK, Mertens F, Netto GJ, Rasheed BA, Riggins G, Rosenquist TA, Schiffman M, Shih IM, Theodorescu D, Torbenson MS, Velculescu V, Wang TL, Wentzensen N, Wood LD, Zhang M, McLendon RE, Bigner DD, Papadopoulos N, Kinzler K, Vogelstein B, Yan H. *TERT* promoter mutations occur frequently in gliomas and in a subset of tumors derived from cells with low rates of self-renewal. *PNAS* 2013 April 9 (co-first author).
37. Chaichana KL, Flores M, Acharya S, Sampognaro P, **Bettegowda C**, Rigamonti D, Weingart J, Olivi A, Gallia GL, Brem H, Lim M, Quinones-Hinojosa A. Survival and Recurrence for Patients Undergoing Surgery of Skull Base Intracranial Metastases. *Journal of Skull Base*. 2013 August 74(4).
38. Chaichana KL, Rao K, Gadkaree S, Dangelmajer S, **Bettegowda C**, Rigamonti D, Weingart J, Olivi A, Gallia GL, Brem H, Lim M, Quinones-Hinojosa A. Factors associated with survival and recurrence for patients undergoing surgery of cerebellar metastases. *Neurol Res*. 2013 Sep 9.
39. Chaichana KL, Gadkaree S, Rao K, Link T, Rigamonti D, Purtell M, Browner I, Weingart J, Olivi A, Gallia G, **Bettegowda C**, Brem H, Lim M, Quinones-Hinojosa A. Patients undergoing surgery of intracranial metastases have different outcomes based on their primary pathology. *Neurol Res*. 2013 Aug. 16.
40. Chaichana KL, Acharya S, Flores M, Wijesekera O, Rigamonti D, Weingart JD, Olivi A, **Bettegowda C**, Gallia GL, Brem H, Lim M, Quinones-Hinojosa A. Identifying better surgical candidates among RPA class 2 patients who underwent surgery for intracranial metastases. *World Neurosurg*. 2013 Sep 24.
41. Liu G, **Bettegowda C**, Qiao Y, Staedtke V, Chan KW, Bai R, Li Y, Riggins GJ, Kinzler KW, Bulte JW, McMahon MT, Gilad AA, Vogelstein B, Zhou S, van Zijl PC. Noninvasive imaging of infection after treatment with tumor-homing bacteria using chemical exchange saturation transfer (CEST) MRI. *Magn Reson Med*. 2013 Oct. 7.
42. Goodwin CR, Yang JX, **Bettegowda C**, Hwang B, James C, Biser A, Raza S, Bender M, Carson B, Lee JY, Lim M. Glycerol rhizotomy via a retrosigmoid approach as an alternative treatment for trigeminal neuralgia. *Clin Neurol Neurosurg*. 2013 Sep 25.
43. Sui IM, Ruzevick J, Zhao Q, Connis N, Jiao Y, **Bettegowda C**, Xia X, Burger PC, Hann CL, Gallia GL. Erlotinib inhibits growth of a patient-derived chordoma xenograft. *PLoS One*. 2013 Nov 15.
44. Fisher CG, Goldschlager T, Boriani S, Varga PP, Fehlings MG, Bilsky MH, Dekutoski MB, Luzzati A, Williams RP, Berven S, Chou D, Reynolds JJ, Quraishi NA, Rhines LD, **Bettegowda C**, Gokaslan ZL. A novel scientific method for rare and often neglected neoplastic conditions. *Evid Based Spine Care J*. 2013 Oct 4.
45. Chaichana KL, Flores M, Acharya S, Sampognaro P, **Bettegowda C**, Rigamonti D, Weingart JD, Olivi A, Gallia GL, Brem H, Lim M, Quinones-Hinojosa A. *J Neurol Surg Skull Base*. 2013 Aug 7.
46. Huse JT, Wallace M, Aldape KD, Berger MS, **Bettegowda C**, Brat DJ, Cahill DP, Cloughesy T, Haas-Kogan DA, Marra M, Miller CR, Nelson SJ, Salama SR, Soffietti R, Wen PY, Yip S, Yen K, Costello JF, Chang S. Where are we now? And where are we going? A report from the Accelerate Brain Cancer Cure (ABC2) Low-grade glioma research workshop. 2013 *Neuro Oncol* Dec 4.
47. **Bettegowda C***, Sausen M*, Leary RJ*, Kinde I*, Wang Y, Agrawal N, Bartlett BR, Wang H, Luber B, Alani RM, Antonarakis ES, Azad NS, Bardelli A, Brem H, Cameron JL, Lee CC, Fecher LA, Gallia GL, Gibbs P, Le D, Giuntoli RL, Goggins M, Hogarty MD, Holdhoff M, Hong SM, Jiao Y, Juhl HH, Kim JJ, Siravegna G, Laheru DA, Lauricella C, Lim M, Lipson EJ, Marie SK, Netto GJ, Oliner KS, Olivi A, Olsson L, Riggins GJ, Sartore-Bianchi A, Schmidt K, Shih IM, Oba-Shinjo SM, Siena S, Theodorescu D, Tie J, Harkins TT, Veronese S, Wang TL, Weingart JD, Wolfgang CL, Wood LD, Xing D, Hruban RH, Wu J, Allen PJ, Schmidt CM, Choti MA, Velculescu VE, Kinzler KW, Vogelstein B, Papadopoulos N, Diaz LA Jr. Detection of circulating tumor DNA in early- and late- stage human malignancies. *Sci Transl Med*. 2014 Feb 19.
48. Li R, Faden DL, Fakhry C, Langelier C, Jiao Y, Wang Y, Wilkerson MD, Pedamallu CS, Old M, Lang J, Loyo M, Ahn SM, Tan M, Gooi Z, Chan J, Richmon J, Wood LD, Hruban RH, Bishop J, Westra WH, Chung CH, Califano J, Gourin CG, **Bettegowda C**, Meyerson M, Papadopoulos N, Kinzler KW, Vogelstein B, DeRisi JL, Koch WM, Agrawal N. Clinical, Genomic and Metagenomic Characterization of Oral Tongue Squamous Cell Carcinoma in Patients Who Do Not Smoke. *Head Neck*. 2014 Jun 21
49. Lange RP, Everett A, Dulloor P, Korley FK, **Bettegowda C**, Blair C, Grossman SA, Holdhoff M. Evaluation of Eight Plasma Proteins as Candidate Blood-Based Biomarkers for Malignant Gliomas. *Cancer Invest*. 2014 Jul 14.

50. Boriani S, Lo SF, Puvanesarajah V, Fisher CG, Varga PP, Rhines LD, Gernscheid NM, Luzzati A, Chou D, Reynolds JJ, Williams RP, Zadnik P, Groves M, Sciubba DM, **Bettegowda C**, Gokaslan ZL; AOSpine Knowledge Forum Tumor. Aneurysmal Bone Cysts of the Spine: Treatment Options and Considerations. *J of Neurooncology*. 2014 Jul 25.
51. Tung D, DeCrescenzo G, Welsch D, Cheung PH, **Bettegowda C**, Saha S. Evaluation of 1-(2-deoxy-2-fluoro-1-D-arabinofuranosyl)-5-iodouracil (FIAU) as an ex vivo bacterial detection agent. *World J Microbiol Biotechnol* 2014 Aug 2.
52. Roberts NJ, Zhang L, Janku F, Collins A, Bai RY, Staedtke V, Rusk AW, Tung D, Miller M, Roix J, Khanna KV, Murthy R, Benjamin RS, Helgason T, Szvalb AD, Bird JE, Roy-Chowdhuri S, Zhang HH, Qiao Y, Karim B, McDaniel J, Elpiner A, Sahora A, Lachowicz J, Phillips B, Turner A, Klein MK, Post G, Diaz LA Jr, Riggins GJ, Papadopoulos N, Kinzler KW, Vogelstein B, **Bettegowda C**, Huso DL, Varterasian M, Saha S, Zhou S. Intratumoral injection of Clostridium novyi-NT spores induces antitumor responses. *Sci Transl Med*. 2014 Aug 13;6(249):249ra111.
53. Fisher CG, Goldschlager T, Boriani S, Varga PP, Rhines LD, Fehlings MG, Luzzati A, Dekutoski MB, Reynolds JJ, Chou D, Berven SH, Williams RP, Quraishi NA, **Bettegowda C**, Gokaslan ZL. An evidence-based medicine model for rare and often neglected neoplastic conditions. *J Neurosurg Spine*. 2014 Sep 5.
54. Zhang M, Wang Y, Jones S, Sausen M, McMahan K, Sharma R, Wang Q, Belzberg AJ, Chaichana K, Gallia GL, Gokaslan ZL, Riggins GJ, Wolinsky JP, Wood LD, Montgomery EA, Hruban RH, Kinzler KW, Papadopoulos N, Vogelstein B, **Bettegowda C**. Somatic mutations of SUZ12 in malignant peripheral nerve sheath tumors. *Nat Genet*. 2014 Oct 12.
55. Chaichana KL, Kone L, **Bettegowda C**, Weingart JD, Olivi A, Lim M, Quinones-Hinojosa A, Gallia GL, Brem H. Risk of surgical site infection in 401 consecutive patients with glioblastoma with and without carmustine wafer implantation. *Neurol Res* 2015 Apr 28.
56. Sciubba DM, Macki M, Bydon M, Gernscheid NM, Wolinsky JP, Boriani S, **Bettegowda C**, Chou D, Luzzati A, Reynolds JJ, Szövérfi Z, Zadnik P, Rhines LD, Gokaslan ZL, Fisher CG, Varga PP. Long-term outcomes in primary spinal osteochondroma: a multicenter study of 27 patients. *J Neurosurg Spine*. 2015 May 20.
57. Goldstein CL, Varga PP, Gokaslan ZL, Boriani S, Luzzati A, Rhines L, Fisher CG, Chou D, Williams RP, Dekutoski MB, Quraishi NA, **Bettegowda C**, Kawahara N, Fehlings MG. Spinal hemangiomas: results of surgical management for local recurrence and mortality in a multicenter study. *Spine*. 2015 May 1;40(9)
58. Wang Y, Springer S, Mulvey CL, Silliman N, Schaefer J, Sausen M, James N, Rettig EM, Guo T, Pickering CR, Bishop JA, Chung CH, Califano JA, Eisele DW, Fakhry C, Gourin CG, Ha PK, Kang H, Kiess A, Koch WM, Myers JN, Quon H, Richmon JD, Sidransky D, Tufano RP, Westra WH, **Bettegowda C**, Diaz LA Jr, Papadopoulos N, Kinzler KW, Vogelstein B, Agrawal N. Detection of somatic mutations and HPV in the saliva and plasma of patients with head and neck squamous cell carcinomas. *Sci Transl Med*. 2015 Jun 24;7(293):293ra104
59. Liu A, Sankey EW, **Bettegowda C**, Burger PC, Jallo GI, Groves ML. Poor prognosis despite aggressive treatment in adults with intramedullary spinal cord glioblastoma. *J Clin Neurosci*. 2015 Jun 30. pii: S0967-5868(15)00238-6
60. Puvanesarajah V, Lo SL, Aygun N, Liauw JA, Jusué-Torres I, Lina IA, Hadelsberg U, Elder BD, Bydon A, **Bettegowda C**, Sciubba DM, Wolinsky JP, Rigamonti D, Kleinberg LR, Gokaslan ZL, Witham TF, Redmond KJ, Lim M. Prognostic factors associated with pain palliation after spine stereotactic body radiation therapy. *J Neurosurg Spine*. 2015 Jul 31:1-10
61. Eseonu CI, Goodwin CR, Zhou X, Theodros D, Bender MT, Mathios D, **Bettegowda C**, Lim M. Reduced CSF leak in complete calvarial reconstructions of microvascular decompression craniectomies using calcium phosphate cement. *J Neurosurg*. 2015 Jul 31:1-4.
62. Wang Y, Springer S, Zhang M, McMahan KW, Kinde I, Dobbyn L, Ptak J, Brem H, Chaichana K, Gallia GL, Gokaslan ZL, Groves ML, Jallo GI, Lim M, Olivi A, Quinones-Hinojosa A, Rigamonti D, Riggins GJ, Sciubba DM, Weingart JD, Wolinsky JP, Ye X, Oba-Shinjo SM, Marie SK, Holdhoff M, Agrawal N, Diaz LA Jr, Papadopoulos N, Kinzler KW, Vogelstein B, **Bettegowda C**. Detection of tumor-derived DNA in cerebrospinal fluid of patients with primary tumors of the brain and spinal cord. *Proc Natl Acad Sci U S A*. 2015 Aug 4;112(31):9704-9
63. Liu A, Jain A, Sankey EW, Jallo GI, **Bettegowda C**. Sporadic intramedullary hemangioblastoma of the spine: a single institutional review of 21 cases. *Neurol Res*. 2015 Sep 10.

64. Fehlings MG, Nater A, Zamorano JJ, Tetreault LA, Varga PP, Gokaslan ZL, Boriani S, Fisher CG, Rhines L, **Bettegowda C**, Kawahara N, Chou D. Risk Factors for Recurrence of Surgically Treated Conventional Spinal Schwannomas: Analysis of 169 Patients from a Multicenter International Database. *Spine*. 2015 Oct 17.
65. Gokaslan ZL, Zadnik PL, Sciubba DM, Gersmscheid N, Goodwin CR, Wolinsky JP, **Bettegowda C**, Groves ML, Luzzati A, Rhines LD, Fisher CG, Varga PP, Dekutoski MB, Clarke MJ, Fehlings MG, Quraishi NA, Chou D, Reynolds JJ, Williams RP, Kawahara N, Boriani S. Mobile spine chordoma: results of 166 patients from the AOSpine Knowledge Forum Tumor database. *J Neurosurg Spine*. 2015 Dec 18.
66. Goodwin CR, Liang L, Abu-Bonsrah N, Hdeib A, Elder BD, Kosztowski T, **Bettegowda C**, Lattera J, Burger P, Sciubba DM. Extraneural glioblastoma multiforme vertebral metastasis. *World Neurosurg*. 2015 Dec 15.
67. Fisher CG, Versteeg AL, Dea N, Boriani S, Varga PP, Dekutoski MB, Luzzati A, Gokaslan ZL, Williams RP, Reynolds JJ, Fehlings MG, Gersmscheid NM, **Bettegowda C**, Rhines LD. Surgical management of spinal chondrosarcomas. *Spine (Phila Pa 1976)*. 2016 Feb 4.
68. Binder ZA, Wilson KM, Salmasi V, Orr BA, Eberhart CG, Siu IM, Lim M, Weingart JD, Quinones-Hinojosa A, **Bettegowda C**, Kassam AB, Olivi A, Brem H, Riggins GJ, Gallia GL. Establishment and Biological Characterization of a Panel of Glioblastoma Multiforme (GBM) and GBM Variant Oncosphere Cell Lines. *PLoS One*. 2016 Mar 30;11(3)
69. Goodwin CR, Woodard CL, Zhou X, Pan J, Olivi A, Xia S, **Bettegowda C**, Sciubba DM, Pevsner J, Zhu H, Lattera J. Microarray-Based Phospho-Proteomic Profiling of Complex Biological Systems. *Transl Oncol*. 2016 Apr;9(2):124-9
70. Zhang XM, Zhang HH, McLeroth P, Berkowitz RD, Mont MA, Stabin MG, Siegel BA, Alavi A, Barnett TM, Gelb J, Petit C, Spaltro J, Cho SY, Pomper MG, Conklin JJ, **Bettegowda C**, Saha S. [(124)I]FIAU: Human dosimetry and infection imaging in patients with suspected prosthetic joint infection. *Nucl Med Biol*. 2016 May;43(5):273-9.
71. Wang J, Bender MT, **Bettegowda C**. Percutaneous Procedures for the Treatment of Trigeminal Neuralgia. *Neurosurg Clin N Am*. 2016 Jul;27(3):277-95.
72. Maxwell R, Garzon-Muvdi T, Lipson EJ, Sharfman WH, **Bettegowda C**, Redmond KJ, Kleinberg LR, Ye X, Lim M. BRAF-V600 mutational status affects recurrence patterns of melanoma brain metastasis. *Int J Cancer*. 2016 Jun 25.
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76. Sciubba DM, De la Garza Ramos R, Goodwin CR, Abu-Bonsrah N, Bydon A, Witham TF, **Bettegowda C**, Gokaslan ZL, Wolinsky JP. Clinical, surgical, and molecular prognostic factors for survival after spinal sarcoma resection. *Neurosurg Focus*. 2016 Aug; 41(2)
77. Plotkin SR, Davis SD, Robertson KA, Akshintala S, Allen J, Fisher MJ, Blakeley JO, Widemann BC, Ferner RE, Marcus CL; **REiNS International Collaboration**. Sleep and pulmonary outcomes for clinical trials of airway plexiform neurofibromas in NF1. *Neurology*. 2016 Aug 16;87(7 Suppl 1):S13-20
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79. Ahlawat S, Fayad LM, Khan MS, Bredella MA, Harris GJ, Evans DG, Farschtschi S, Jacobs MA, Chhabra A, Salamon JM, Wenzel R, Mautner VF, Dombi E, Cai W, Plotkin SR, Blakeley JO; Whole Body MRI Committee for the REiNS International Collaboration. REiNS International Collaboration Members 2016.

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83. Charest-Morin R, Boriani S, Fisher CG, Patel SR, Kawahara N, Mendel E, **Bettegowda C**, Rhines LD. Benign Tumors of the Spine: Has New Chemotherapy and Interventional Radiology Changed the Treatment Paradigm? *Spine (Phila Pa 1976)*. 2016 Oct 15;41 Suppl 20:S178-S185.
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85. Goodwin CR, Abu-Bonsrah N, Rhines LD, Verlaan JJ, Bilsky MH, Laufer I, Boriani S, Sciubba DM, **Bettegowda C**. Molecular Markers and Targeted Therapeutics in Metastatic Tumors of the Spine: Changing the Treatment Paradigms. *Spine (Phila Pa 1976)*. 2016 Oct 15;41 Suppl 20:S218-S223.
86. Ailon T, Torabi R, Fisher CG, Rhines LD, Clarke MJ, **Bettegowda C**, Boriani S, Yamada YJ, Kawahara N, Varga PP, Shin JH, Sahgal A, Gokaslan ZL. Management of Locally Recurrent Chordoma of the Mobile Spine and Sacrum: A Systematic Review. *Spine (Phila Pa 1976)*. 2016 Oct 15;41 Suppl 20:S193-S198.
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88. De la Garza Ramos R, Goodwin CR, Jain A, Abu-Bonsrah N, Fisher CG, **Bettegowda C**, Sciubba DM. Development of a Metastatic Spinal Tumor Frailty Index (MSTFI) Using a Nationwide Database and Its Association with Inpatient Morbidity, Mortality, and Length of Stay After Spine Surgery. *World Neurosurg*. 2016 Nov; 95:548-555.e4
89. Batista N, Tee J, Sciubba D, Sahgal A, Laufer I, Weber M, Gokaslan Z, Rhines L, Fehlings M, Patel S, Raja Rampersaud Y, Reynolds J, Chou D, **Bettegowda C**, Clarke M, Fisher C. Emerging and established clinical, histopathological and molecular parametric prognostic factors for metastatic spine disease secondary to lung cancer: Helping surgeons make decisions. *J Clin Neurosci*. 2016 Dec;34:15-22.
90. Mathios D, Kim JE, Mangraviti A, Phallen J, Park CK, Jackson CM, Garzon-Muvdi T, Kim E, Theodoros D, Polanczyk M, Martin AM, Suk I, Ye X, Tyler B, **Bettegowda C**, Brem H, Pardoll DM, Lim M. Anti-PD-1 antitumor immunity is enhanced by local and abrogated by systemic chemotherapy in GBM. *Sci Transl Med*. 2016 Dec 21;8(370):370ra180.
91. Wang J, **Bettegowda C**. Applications of DNA-Based Liquid Biopsy for Central Nervous System Neoplasms. *Mol Diagn*. 2017 Jan;19(1):24-34.
92. Daniels M, Garzon-Muvdi T, Maxwell R, Tamargo RJ, Huang J, Witham T, **Bettegowda C**, Chaichana KL. Pre-Residency Publication Number Does Not Predict Academic Career Placement in Neurosurgery. *World Neurosurg*. 2017 Feb 15

Invited Review Articles

1. Zhou S, **Bettegowda C**, Agrawal N. Review Article: Bacteriolytic therapy for cancer. *Discovery Medicine*. April 2004
2. Hsu W, **Bettegowda C**, Jallo GI. Intramedullary Spinal Cord Tumor Surgery: Can we do it without neurophysiological monitoring? *Childs Nerv Syst*. 2009 Nov 10.

3. **Bettegowda C.** Staying Alive: Specifically Targeting Tumor Vessels with Anti-Angiogenesis Therapy. *Science Translational Medicine* 7 March 2012.
4. **Bettegowda C.** Tumors and Microbes Sitting in a Tree. *Science Translational Medicine* 4 April 2012.
5. **Bettegowda C.** Brain Tumor Diagnostics Go Micro. *Science Translational Medicine* 4 May 2012.
6. **Bettegowda C,** Papadopoulos N, Agrawal N. Mapping Genes for Oligodendroglioma. *Journal of Personalized Medicine.* Vol. 9 May 2012.
7. **Bettegowda C,** Pesticides Perturb Prenatal Brain. *Science Translational Medicine* 30 May 2012.
8. **Bettegowda C,** Circulating Tumor Cells Bad News in Breast Cancer. *Science Translational Medicine* 25 July 2012.
9. Loyo M, Li R, **Bettegowda C,** Pickering C, Frederick M, Myers F, Agrawal N. Lessons learned from Next Generation Sequencing in Head and Neck Cancer. *Head and Neck.* 21 Aug 2012.
10. **Bettegowda C,** A Window of Opportunity for Alzheimer's Disease. *Science Translational Medicine* 22 August 2012.
11. **Bettegowda C,** Fruit Flies Create a Buzz About Hearing. *Science Translational Medicine* 19 September 2012.
12. **Bettegowda C.** Ironing out MYC in Prostate Cancer. *Science Translational Medicine* 17 October 2012.
13. **Bettegowda C.** Reactivating the natural killer. *Science Translational Medicine* 14 November 2012.
14. **Bettegowda, C.** Remembering the variants in Alzheimer's Disease. *Science Translational Medicine* 12 December 2012
15. **Bettegowda C,** Fragmenting malignant melanoma. *Science Translational Medicine* 16 January 2013.
16. **Bettegowda C.** Running interference on tumor growth. *Science Translational Medicine* 13 February 2013.
17. Zadnik P, Burger P, Gokaslan Z, **Bettegowda C.** Spinal cord tumors: genetic advances and implications for treatment. *Nature Reviews Neurology* 26 March 2013.
18. Ambady P, **Bettegowda C,** Holdhoff M. Emerging methods for disease monitoring in malignant gliomas. *CNS Oncology.* 2013 November 2(6); 511-522
19. Wang J and **Bettegowda C.** Genomic discoveries in adult astrocytoma. *Curr Opin Genet Dev.* 2015 January 20.
20. Wang J and **Bettegowda C.** Genetics and immunotherapy: using the genetic landscape of gliomas to inform management strategies. *J Neurooncol.* 2015 February 21.
21. Theodros D, Patel M, Ruzevick J, Lim M, **Bettegowda C.** Pituitary adenomas: historical perspective, surgical management and future directions. *CNS Oncol.* 2015 December 4(6).
22. Baron R, Ferriero DM, Frisoni GB, **Bettegowda C,** Gokaslan ZL, Kessler JA, Vezzani A, Waxman SG, Jarius S, Wildemann B, Weller M. Neurology-the next 10 years. *Nat Rev Neurol.* 2015 November 11.

Book Chapters, Monographs

1. **Bettegowda C,** Huang J. Burr Holes. *In* Fundamentals of Operative Neurosurgery (Connolly E, McKhann G, Huang J, Choudhri T, eds.) Thieme. New York, NY. 2009.
2. **Bettegowda C,** Huang J. Epidural Hematoma Evacuation. *In* Fundamentals of Operative Neurosurgery (Connolly E, McKhann G, Huang J, Choudhri T, eds). Thieme. New York, NY. 2009.
3. **Bettegowda C,** Huang J. Subdural Hematoma Evacuation. *In* Fundamentals of Operative Neurosurgery (Connolly E, McKhann G, Huang J, Choudhri T, eds). Thieme. New York, NY. 2009.
4. **Bettegowda C,** Huang J. Infected Bone Flap and Subdural or Epidural Abscess/Empyema. *In* Fundamentals of Operative Neurosurgery (Connolly E, McKhann G, Huang J, Choudhri T, eds). Thieme. New York, NY. 2009.
5. **Bettegowda C,** Jallo G. Suboccipital and Teleovelar Approaches. *In* Contemporary Skull Base Surgery (Quinones A, Conway J, Jallo G eds). Plural. San Diego, CA. 2009.
6. **Bettegowda C,** Amin A, Hoang S, Jallo G. Supratentorial Tumors. *In* Handbook of Neurosurgery (Rigamonti ed). Thieme. New York, NY. 2009.
7. **Bettegowda C,** Batra S, Chan J, Rigamonti D. Cerebral Metastases. *In* Handbook of Neurosurgery (Rigamonti ed). Thieme. New York, NY. 2009.
8. Hoang S, **Bettegowda C,** Jallo G. Craniopharyngiomas and Suprasellar Tumors. *In* Handbook of Neurosurgery (Rigamonti ed). Thieme. New York, NY. 2009.
9. Hoang S, **Bettegowda C,** Jallo G. Pediatric Posterior Fossa Tumors. *In* Handbook of Neurosurgery (Rigamonti ed). Thieme. New York, NY. 2009.

10. **Bettegowda C**, Raza S, Jallo G, Quinones A. Supraorbital Craniotomy. *In* Essential Technique in Operative Neurosurgery. (Jandial R, McCormick P, Black P eds). Elsevier. New York, NY. 2009.
11. **Bettegowda C**, Mehta V, Kretzer R, Jallo G. Intramedullary Spinal Cord Cavernous Malformation. *In* Essential Technique in Operative Neurosurgery. (Jandial R, McCormick P, Black P eds). Elsevier. New York, NY. 2009.
12. Kretzer R, **Bettegowda C**, Jallo G. Intradural Tumor – Meningioma. *In* Essential Technique in Operative Neurosurgery. (Jandial R, McCormick P, Black P eds). Elsevier. New York, NY. 2009.
13. **Bettegowda C**, Kretzer R, Belzberg A, Jallo G. Intradural Nerve Sheath Tumors. *In* Essential Technique in Operative Neurosurgery. (Jandial R, McCormick P, Black P eds). Elsevier. New York, NY. 2009.
14. Kretzer R, **Bettegowda C**, Jallo G. Intramedullary Spinal Cord Tumors. *In* Essential Technique in Operative Neurosurgery. (Jandial R, McCormick P, Black P eds). Elsevier. New York, NY. 2009.
15. **Bettegowda C**, Chen L, Mehta V, Jallo GI, Rutka J. Supratentorial Tumors in the Pediatric Population: Multidisciplinary Management. Schmidek and Sweet's Operative Neurosurgical Techniques, Sixth Edition. Elsevier. New York, NY. 2010.
16. **Bettegowda C**, Byun Y, Foss C, Nimmagadda S, Sgourous G, Ambinder R, Pomper M. Imaging Infection Based on Expression of Thymidine Kinase. Target Molecular Imaging. (Welch and Eckelman eds). First Edition. Taylor & Francis. New York, NY. 2012.
17. Papadimitriou K, **Bettegowda C**, Vrionis F. Molecular Genetics of Brain Tumors. Gliomas: Symptoms, Diagnosis and Treatment Options. (Wiranowska and Vrionis eds). Nova Science. Hauppauge, NY 2012.
18. Wang J, **Bettegowda C**, Jallo GI. The Genetic Landscape of the Childhood Cancer Medulloblastoma. (Bednok et al eds). Congress of Neurological Surgeons, Schaumburg IL 2014.

Case Reports

1. Mehta V, **Bettegowda C**, Jallo GI. Intramedullary Tumoral Calcinosis, A Case Report. *Journal of Neurosurgery: Pediatrics*. 2010, June 5.
2. Mehta V, **Bettegowda C**, Singer HS, Ahn E. Medullary Cistern Choroid Plexus Papilloma. *Childs Nervous System*. 2010, August 14.
3. Bydon M, De la Garza-Ramos R, **Bettegowda C**, Suk I, Wolinsky JP, Gokaslan ZL. En Bloc Resection of a Giant Cell Tumor in the Sacrum via a Posterior-Only Approach Without Nerve Root Sacrifice: Technical Case Report. *Neurosurgery*. 2015 Sep;11

FUNDING

Extramural Sponsorship

Current

- | | |
|-----------------|---|
| 9/1/12-8/31/17 | Translational molecular profiling of oligodendrogliomas.
Burroughs Wellcome Fund Career Award for Medical Scientists
Direct: \$700,000
Role: PI Major Goals: Study the global genetic and epigenetic profiles of oligodendrogliomas to understand the key pathways that are dysregulated and attempt to harness this information for diagnostic, prognostic and therapeutic benefit. |
| 7/1/14-6/30/17 | Blood based biomarkers for hereditary cancer syndromes using neurofibromatosis 1 as a model.
Doris Duke Clinical Scientist Development Award
Direct: \$486,000
Role: PI
Major Goals: Develop a screening test for malignant peripheral nerve sheath tumors in individuals with Neurofibromatosis 1. |
| 1/1/16-12/31/16 | Development of personalized biomarkers for children with medulloblastoma.
Alex's Lemonade Stand
Direct: \$40,000 |

Role: PI
Major Goals: Develop biomarkers capable of detecting disease burden in individuals with medulloblastoma.

3/1/16-2/28/19 Exploiting frequent alterations in PRC2 in MPNSTs for translational benefit
Department of Defense
Direct: \$575,000 Total: \$931,500
Role: PI
Major Goals: Exploit mutations in the PRC2 complex for diagnostic purposes in individuals with MPNST

6/1/16-5/31/17 Development of personalized biomarkers for individuals with primary spinal column neoplasms.
AOSpine North America Young Investigator Research Grant.
\$30,000
Role: PI.
Major Goals: Develop a blood based test to measure disease burden in individuals with primary spinal column tumors.

9/1/16-8/31/18 Provocative Question 6: Exploiting Frequent Alterations in the PRC2 Complex to Distinguish Benign Neurofibromas from Malignant Peripheral Nerve Sheath Tumors
National Cancer Institute R21
Direct: \$275,000
Role: PI
Major Goals: Understand the molecular progression from benign neurofibroma to malignant peripheral nerve sheath tumor.

Pending Tumor Derived DNA in Cerebrospinal Fluid as a Biomarker for Central Nervous System Malignancies
National Cancer Institute R01
Direct: \$1,250,000 Total: \$2,025,000
Role: PI
Major Goals: Use tumor derived DNA in the CSF as a biomarker to track disease status in individuals with primary brain tumors.

Past
1/1/12-12/31/12 The development of novel diagnostic methods for managing children with brain tumors
Pediatric Brain Tumor Foundation; Vogelstein/Bettegowda (co-PI)
\$100,000
PI: Bert Vogelstein
Role: Co-PI, 10%; Major Goals: Develop non-invasive methods of monitoring disease burden in children with brain tumors.

3/1/12-3/1/13 Circulating Tumor DNA as a Biomarker for Malignant Peripheral Nerve Sheath Tumors
American Association of Neurological Surgeons/Congress of Neurological Surgeons Spine Section David Kline Peripheral Nerve Research Award
\$15,000
Role: PI, 0%; Major Goals: Develop novel blood based biomarkers for patients with malignant peripheral nerve sheath tumors.

11/1/12-10/31/13 Therapeutic and Diagnostic Strategies in Oligodendroglioma.
Brain Science Institute Translational Research Grant.
\$40,000

Role: PI. Major Goals: Develop *in vitro* and animal models of oligodendroglioma to test various targeted therapeutics. In addition, develop novel biomarkers for patients with oligodendrogliomas.

- 7/1/12-6/30/13
Translational molecular genetics of brain tumors
Johns Hopkins University Clinical Scholars Award
\$80,000
Role: PI, 15%
- 1/1/13-12/31/13
The development of novel diagnostic methods for managing children with CNS tumors
Pediatric Brain Tumor Foundation; Vogelstein/Bettegowda (co-PI)
\$100,000
PI: Bert Vogelstein
Role: Co-PI, 15%; Major Goals: Develop non-invasive methods of monitoring disease burden in children with brain tumors.
- 7/1/13-6/30/14
Translational molecular genetics of brain tumors
Johns Hopkins University Clinical Scholars Award
\$80,000
Role: PI, 15%
- 1/1/14-12/31/14
The development of novel diagnostic methods for managing children with CNS tumors
Pediatric Brain Tumor Foundation; Vogelstein/Bettegowda (co-PI)
\$100,000
PI: Bert Vogelstein
Role: Co-PI, 15%; Major Goals: Develop non-invasive methods of monitoring disease burden in children with brain tumors.
- 4/1/14-3/31/15
Development of personalized biomarkers for individuals with primary spinal column neoplasms.
AOSpine North America Young Investigator Research Grant.
\$30,000
Role: PI.
Major Goals: Develop a blood based test to measure disease burden in individuals with primary spinal column tumors.
- 1/01/11-03/01/15
Genetic Alterations in Intramedullary Spinal Cord Tumors
Malia's Cord Foundation; Jallo (PI)
Direct: \$300,000
PI: George Jallo
Role: Co-Investigator, 0%; Major Goals: Determine the global mutational profile of spinal ependymomas and astrocytomas and compare them to their intracranial counterparts.
- 11/1/13-10/30/15
Development of novel personalized biomarkers for individuals with chordoma.
Chordoma Foundation
Direct: \$125,000
Role: PI. Major Goals: Develop blood based tests to track disease burden in individuals with chordoma.

CLINICAL ACTIVITIES

Clinical Focus

My clinical practice is focused on the multi-disciplinary management of individuals with brain and spinal cord tumors. I perform both open surgical procedures as well as stereotactic radiosurgery. In addition, I offer comprehensive care for patients with trigeminal neuralgia.

Certification

Licensure

2012-present Maryland, #D74560

Boards, Specialty Certification

2012 Board eligible, American Board of Neurological Surgeons

Clinical Service Responsibilities

2012-Present Attending neurosurgeon, Johns Hopkins Hospital

2012-Present Attending neurosurgeon, Johns Hopkins Hospital

2013-Present Neurosurgeon, Baltimore, VA Hospital

Clinical Reputation/Recognition

N/A

Clinical Productivity

Perform on average > 200 surgery and radiosurgery cases per year.

Clinical Draw from outside local/regional area

36% of operative cases are from out-of-state

Examiner for specialty board

N/A

Clinical Program Building / Leadership

2013-present First Johns Hopkins Neurosurgeon to Provide Neurosurgical Care at Maryland, VA Hospital.

2015-present Heading Johns Hopkins Brain Tumor Clinical Practice Improvement Initiative

2015-present Member Neurosurgery/Neurology Appointment and Promotions Committee

Clinical Demonstration Activities

12/2014 Speaker, Treatment Options for Trigeminal Neuralgia, Trigeminal Neuralgia Association, Columbia, MD

EDUCATIONAL ACTIVITIES**Educational Focus**

I teach students, residents and fellows in and out of the operating room on the evaluation and management of neurosurgical diseases including primary and metastatic brain and spinal tumors, trigeminal neuralgia, and intracranial trauma. I also mentor students, residents and fellows on neurosurgery related clinical outcomes research as well as laboratory based efforts studying cancer genetics. I have mentored undergraduate and medical students, as well as residents.

Teaching**Classroom Instruction**

6/2013 Speaker, Medical Students, Johns Hopkins School of Medicine Neuro-Oncology Interest Group, Baltimore, MD, "My Path to Neurosurgery"

Clinical Instruction

In the operating room, I teach all levels of students and residents the surgical management of brain and spinal cord tumors, trigeminal neuralgia, head trauma and hydrocephalus. I guide residents and students daily on the inpatient management of neurosurgical problems. Students and residents alike participate in my weekly clinic to learn the outpatient management of neurosurgical disorders. I also mentor residents to obtain knowledge on stereotactic radiosurgery and other radiation treatment regimens available for individuals with tumors of the brain and spine. In

addition, I have overseen and participate in our monthly journal club seminars for the residents. I also give several grand round lectures every year focused on educating residents on various aspects of clinical and research arenas within neuro-oncology.

CME Instruction:

JHMI/Regional

- 07/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Cancer Genetics for the Neurosurgeon”
- 08/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Brain Tumor Emergencies”
- 09/2012 Moderator, Audience was neuro-oncology clinicians and researchers from around world, Basic Science Session, 11th Annual International Neuro-Oncology Update, Baltimore MD
- 09/2012 Speaker, Audience was neuro-oncology clinicians and researchers from around world, 11th Annual International Neuro-Oncology Updates, Baltimore, MD
“Genetic Profiling of Oligodendrogliomas”
- 11/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Biomarkers for Medulloblastoma”
- 2/2013 Speaker, Medical Oncology Grand Rounds, The Johns Hopkins Hospital
“Surgical Management of Spinal Metastases”
- 3/2013 Speaker, Neuro-Oncology Research Conference, The Johns Hopkins Hospital
“Molecular Classification of Brain Tumors”
- 10/2013 Speaker, Translational Research Conference, Johns Hopkins Oncology Center, Baltimore, MD.
“Blood based biomarkers for the detection and monitoring of human malignancies”
- 1/2014 Speaker, Clinical Neurosciences Seminar, Baltimore MD. The Johns Hopkins Hospital,
“Circulating Tumor DNA as a Biomarker for Human Malignancies”.
- 1/2015 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Updates in Cancer Genetics for the Neurosurgeon”.
- 2/2017 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Updates in Cancer Genetics for the Neurosurgeon”.
- 3/2017 Speaker, Prince George’s Hospital, Washington DC
“Surgical and Radiation Management of Brain and Spinal Cord Tumors”

National

- 7/2013 Speaker, Audience was physicians from USA, Vokkaligara Parishat of America, Chicago, IL
“Altered Mental Status – New Guidelines for Evaluation and Treatment”
- 5/2015 Speaker, Audience was pathologists in New York, New York Pathological Society, New York, NY
“Application of Next Generation Sequencing for the Detection of Circulating Tumor DNA”
- 5/2015 Speaker, American Association of Neurological Surgeons, Washington DC
“Somatic Mutations of SUZ12 in Malignant Peripheral Nerve Sheath Tumors”
- 6/2015 Speaker, 2015 Children’s Tumor Foundation Neurofibromatosis Conference, Monterey, CA
“Liquid Diagnostics: Biomarkers for the Neurofibromatoses”
- 3/2016 Speaker, American College of Radiation Oncology Annual Meeting, Lake Buena Vista, FL
“The New Molecular Categories of Glioma: What You Need to Know to Properly Treat Your Patients Today”
- 8/2016 Speaker, Methodist Hospital, Division of Thomas Jefferson Hospital, Philadelphia PA
“Surgical and Radiation Treatment Options for Brain Tumors”

International

- 09/2012 Speaker, Audience was international spine surgeons, 2nd Annual Bologna-Budapest Spine Meeting, Budapest, Hungary
“Genetics of Primary Spinal Column Tumors”
- 6/2014 Neurosurgical Society of America, St. Andrews, New Brunswick Canada
Speaker, “Translational molecular profiling of oligodendrogliomas”.
- 6/2014 Speaker, Neurosurgical Society of America, St. Andrews, New Brunswick Canada
“The promise of personalized cancer care”.

- 4/2015 Speaker, Neurosurgical Society of America, Newport Beach, CA.
“Prognostic Significance of the T gene SNP rs2305089 in Individuals with Spinal Column Chordoma”
- 5/2015 Speaker, Global Spine Congress 2015, Buenos Aires Argentina
“Prognostic significance of T gene SNP rs2305089 in individuals with spinal column chordoma”.
- 5/2015 Speaker, Global Spine Congress 2015, Buenos Aires Argentina
“Outcomes following surgical intervention for impending and gross instability caused by multiple myeloma in the spinal column”.
- 10/2015 Speaker, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Molecular studies associated with primary and metastatic lesions”
- 10/2015 Speaker, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Multidisciplinary management of spine metastases, to reduce morbidity and improve outcomes
- 10/2015 Moderator, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Management of spine tumors”
- 4/2016 Speaker, Global Spine Congress 2016, Dubai, UAE
“Clinical Decision Making: Integrating Advances in the Molecular Understanding of Primary Spine and Metastatic Tumors”
- 4/2016 Moderator, Global Spine Congress 2016, Dubai, UAE
“Novel technologies in spine surgery”

Workshops/Seminars

N/A

Mentoring

Undergraduate Advisees:

1. Anvesh Annadanam, BS 2013-2015
Current Position: Medical Student
Johns Hopkins University
Baltimore, MD 21218
2. Gabriela Frid, BS Candidate 2013-2017
Current Position: Undergraduate Student
Johns Hopkins University
Baltimore, MD 21218

Pre-Doctoral Advisees:

1. Vivek Mehta, MD 2010-2011
Current Position: Resident, Department of Neurosurgery
University of Southern California
Los Angeles, CA 90033
Shared publications: 14, 15, 16
2. Amit Jain, MD 2011-2012
Current Position: Resident, Department of Orthopedic Surgery
Johns Hopkins University School of Medicine
Baltimore, MD 21287
Shared publications: 29, 63
3. Anu Amin, MD 2011-2012
Current Position: Resident, Department of Neurosurgery
New York Medical College
Valhalla, NY 10595
Shared publications: 29

4. Joanna Wang, BS 2014-2015
Current Position: Medical Student
Johns Hopkins University School of Medicine
Baltimore, MD 21287
Shared publications: 19, 20
5. Ann Liu, BS 2014-2015
Current Position: Medical Student
Wake Forest University School of Medicine
Winston-Salem, NC 27157
Shared publications: 59, 63
6. Josh Cohen, BS 2016-current
Current Position: PhD Student
Johns Hopkins University School of Medicine
Baltimore, MD 21287
Shared publications:

Post-Doctoral Advisees:

1. Larry Lo, MD 2013-2015
Resident Department of Neurosurgery
Johns Hopkins University School of Medicine
Baltimore, MD 21287
2. Rory Goodwin, MD/PhD 2014-2016
Resident Department of Neurosurgery
Johns Hopkins University School of Medicine
Baltimore, MD 21287
3. Tomas Garzon, MD 2015-current
Resident Department of Neurosurgery
Johns Hopkins University School of Medicine
Baltimore, MD 21287

Thesis Committees

N/A

Educational Program Building / Leadership

N/A

Educational Demonstration

N/A

RESEARCH ACTIVITIES

My clinical research focus is based on understanding how neurosurgical interventions alter patient outcomes. My laboratory based research is focused on understanding the genetic basis of central nervous system tumors and applying that knowledge for clinical benefit.

Research Program Building/Leadership

N/A

Research Demonstration Activities

N/A

Inventions, Patents, Copyrights

May, 2005	United States Patent WO2005039491A2, "Improved Combination Bacteriolytic Therapy for the Treatment of Tumors"
March, 2008	United States Patent US7344710, "Combination Bacteriolytic Therapy for the Treatment of Tumors"
May, 2012	United States Patent US 11/629,607, "Imaging Infection with Compounds the Bind to Thymidine Kinase"
July, 2012	United States Provision Patent US14/233,296, "Oligodendroglioma driver genes"
Sept, 2012	United States Provision Patent US14/347,463, "Methods and composition for detecting infections"
April, 2015	United States Provisional Patent US14/439,041, "Papanicolaou Test for Ovarian and Endometrial Cancers"
July, 2015	United States Provisional Patent US62/192,424, "Detection of Tumor-Derived DNA in Cerebrospinal Fluid"
August, 2015	United States Provisional Patent US14/765,692, "TERT Promoter Mutations in Gliomas and a Subset of Tumors"

Technology Transfer Activities

N/A

SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES

System Innovation Focus

I am focused on improving health delivery for our patients with brain tumors. In particular I am interested in improving safety and satisfaction in those individuals undergoing a craniotomy for resection of a brain tumor.

System Innovation and Quality Improvement Efforts within JHMI:

2013-Present Working with neuropathology and neurosurgery to develop streamline tumor banking protocol.
2015-Present Physician lead for Johns Hopkins Brain Tumor Clinical Community

System Innovation and Quality Improvement Efforts outside of JHMI:

N/A

System Innovation and Quality Improvement Program Building/Leadership:

N/A

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

2016-Current Director of Johns Hopkins Meningioma Center

Editorial Activities

Editorial Board Appointments:

2015-present *Annals of Surgical Oncology*, Editorial Board Member
2015-present *Operative Neurosurgery*, Editorial Board Member

Journal Peer Review Activities

2009-present *Molecular Imaging*, Ad Hoc Reviewer
2010-present *Neurosurgery*, Ad Hoc Reviewer

2011-present *International Journal of Medical Microbiology*, Ad Hoc Reviewer
2012-present *Annals of Surgical Oncology*, Ad Hoc Reviewer
2013-present *Child's Nervous System*, Ad Hoc Reviewer
2013-present *Science*, Ad Hoc Reviewer
2013-present *Cancer Research*, Ad Hoc Reviewer
2014-present *Nature Communications*, Ad Hoc Reviewer
2014-present *Oncotarget*, Ad Hoc Reviewer
2015-present *Clinical Cancer Research*, Ad Hoc Reviewer
2015-present *Neuro-oncology*, Ad Hoc Reviewer

Other Peer Review Activities

N/A

Professional Societies

2006-Present American Association of Neurological Surgeons (AANS)
2011-Present American Association of Cancer Researchers
2014-Present Congress of Neurological Surgeons (CNS)

Advisory Committees, Review Groups/Study Sections

2008-2010 Elected to Young Neurosurgeons Committee (YNC) of AANS
2011 YNC liaison to the Tumor Section of AANS
2012-2013 Associate Scientific Advisor, Science Translational Medicine
2012-Present AO Spine Tumor Knowledge Forum Steering Committee

Conference Organizer

JHMI

N/A

National

Sept 2016 Tumor Satellite Meeting, Congress of Neurological Surgeons, San Diego CA

International

N/A

Session Chair

JHMI

N/A

National

11/2013 Circulating Nucleic Acids in Plasma and Serum Meeting, Baltimore MD, "Legal, Regulatory and Clinical Considerations of CNAPS".
8/2014 Next Generation Diagnostics Summit, Washington DC
"Applications of Cell Free Tumor DNA in the Clinic"

International

5/2015 Session on Spinal Oncology, Global Spine Congress 2015, Buenos Aires, Argentina

Consultantships

N/A

RECOGNITION

Awards, Honors

1994 Benjamin N. Duke Scholarship: Full scholarship given to 5-10 top students from North and South Carolina

1994 Watson IBM Scholarship for Scholastic Excellence: Annual award given for academic achievement to students who are children of IBM employees

2005 Alpha Omega Honor Society, The Johns Hopkins University School of Medicine

2005 Oncology Fellows Research Award: First place for translational research in oncology, The Johns Hopkins University School of Medicine

2005 Hunterian Neurosurgery Research Award, The Johns Hopkins University School of Medicine

2008 Sherman Award for Neurosurgery Resident Achievement, The Johns Hopkins University School of Medicine

2009 American Brain Tumor Associate Research Fellowship

2011 Harvey Cushing Award for Neurosurgery Research Excellence, The Johns Hopkins University School of Medicine

2012 David Kline Research Award, AANS/ CNS Spine Section

2012 Helen B. Taussig Award, Given for Most Outstanding Research by Post-Doctoral Fellow, The Johns Hopkins University School of Medicine

2012 Richard S. Ross Clinician Scientist Award Recipient, given annually to the applicant with the best application, The Johns Hopkins University School of Medicine

2012 Irving Sherman Travel Award, Johns Hopkins University School of Medicine

2012 Genome Technology's Seventh Annual "Tomorrow's PI's"; Given to Most Promising Young Investigators in the Country

2015 Sanford Larson Award for Best Peripheral Nerve/Spine Paper, AANS

2016 Reinhoff Scholar Award

Invited Talks, Panels

JHMI/Regional

03/2005 Speaker, PhD Thesis Defense, Cellular and Molecular Medicine, The Johns Hopkins University School of Medicine
"Bacteriolytic Therapy for Cancer"

1/2007 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Developments in the use of an Anaerobic Bacterium in the Treatment of Solid Tumors"

8/2007 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
Speaker, "Brainstem Tumors"

4/2008 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Torticollis"

12/2009 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Intramedullary Spinal Cord Tumors"

4/2010 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Blood Based Biomarkers in Cancer"

4/2010 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Spinal Cord Tethering Following Myelomeningocele Repair"

7/2010 Speaker, Neuro-Oncology Seminar, The Johns Hopkins Hospital
"Blood Based Biomarkers in Cancer"

2/2011 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Advances in the Genetic Understanding of Medulloblastoma"

10/2011 Speaker, Neuro-Oncology Seminar, The Johns Hopkins Hospital
"Genomic Alterations in Oligodendroglioma"

04/2012 Speaker, Helen B. Taussig Young Investigators Day Lecture, The Johns Hopkins University School of Medicine
"A Proposed Genetic Basis for 1p/19q Co-Deletion In Oligodendrogliomas"

06/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Neurosurgical Training at Johns Hopkins"

07/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Cancer Genetics for the Neurosurgeon"

08/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
"Brain Tumor Emergencies"

09/2012 Moderator, Audience was neuro-oncology clinicians and researchers from around world, Basic Science Session, 11th Annual International Neuro-Oncology Update, Baltimore MD

09/2012 Speaker, Audience was neuro-oncology clinicians and researchers from around world, 11th Annual International Neuro-Oncology Updates, Baltimore, MD

11/2012 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Biomarkers for Medulloblastoma”

2/2013 Speaker, Neurosurgery Departmental Dean’s Review, The Johns Hopkins Hospital
“Cancer Genetics”

2/2013 Speaker, Medical Oncology Grand Rounds, The Johns Hopkins Hospital
“Surgical Management of Spinal Metastases”

3/2013 Speaker, Neuro-Oncology Research Conference, The Johns Hopkins Hospital
“Molecular Classification of Brain Tumors”

10/2013 Speaker, Translational Research Conference, Johns Hopkins Oncology Center, Baltimore, MD.
“Blood based biomarkers for the detection and monitoring of human malignancies”

1/2014 Speaker, Clinical Neurosciences Seminar, Baltimore MD. “Circulating Tumor DNA as a Biomarker for Human Malignancies”.

1/2015 Speaker, Neurosurgery Grand Rounds, The Johns Hopkins Hospital
“Updates in Cancer Genetics for the Neurosurgeon”.

2/2015 Speaker, NCCU Lecture Series, The Johns Hopkins Hospital
“Circulating Tumor DNA as a Biomarker for Solid Malignancies”.

2/2015 Speaker, Inaugural Indo-US Translational Neuroscience Symposium, Baltimore MD
“Cell Free Tumor DNA for the Management of Central Nervous System Tumors”

6/2016 Speaker, Assistant Professors Series
“Translating our Genetic Understanding of Cancer into Personalized Biomarkers”

8/2016 Speaker, Radiation Oncology Resident Research Seminar
“Management of Malignant Gliomas”

3/2017 Speaker, Neuroscience in Intensive Care International Symposium, Washington DC
“Towards a Molecular Taxonomy for Cancer”

National

03/2004 Speaker, American Association of Cancer Researchers National Meeting
“Bacteriolytic Therapy for treatment of Solid Malignancies”

12/2008 Speaker, Pediatric Section of American Association of Neurosurgeons
“Choroid Plexus Tumors: A 20 Year Institutional Experience”

3/2011 Speaker, Neurosurgery Grand Rounds, Emory University
“Circulating Tumor DNA as a Personalized Biomarker for Patients with Solid Tumor”

12/2011 Speaker, Department of Neuro-Oncology, Moffitt Cancer Center
“Translating Genomics into Personalized Biomarkers”
“Circulating Tumor DNA as Blood Based Biomarkers in Patients with Solid Tumors”

10/2012 Speaker, 11th Annual Frye Halloran Brain Tumor Symposium, Massachusetts General Hospital, Boston MA
“CIC Mutations in Oligodendrogliomas”

1/2013 Speaker, Low Grade Glioma Meeting, San Francisco, CA
“Molecular Classification of Low Grade Gliomas”

3/2013 Speaker, Chordoma Foundation Biannual Workshop, Boston, MA
“AOSpine Tumor Biobanking”

3/2013 Speaker, Chordoma Foundation Biannual Workshop, Boston, MA
“C. novyi-NT Cancer Therapeutic”

5/2013 Speaker, Pediatric Brain Tumor Foundation Annual Meeting, Ft. Lauderdale, FL
“Novel Diagnostics Methods for Children with Brain Tumors”

5/2013 Speaker, Pediatric Brain Tumor Foundation Annual Meeting, Ft. Lauderdale, FL
“Hot Topics in Pediatric Neuro-Oncology”

9/2013 Speaker, Accelerate Brain Cancer Cure and National Cancer Institute Meeting on Glioblastoma. Washington DC

- 2/2014 “Breakout Session Summary on Genomic Medicine to Advance Glioblastoma”
Speaker, Association for Collaborative Spine Research. San Diego, CA. “Prognostic Significance of T Gene snp2305089 in Individuals with Spinal Column Chordoma”.
- 2/2014 Speaker, Association for Collaborative Spine Research. San Diego, CA. “Aneurysmal Bone Cysts of the Spine: Treatment Options and Considerations”.
- 3/2014 Speaker, American Association of Neurological Surgeons/Congress of Neurological Surgeons Spine Section Meeting. Orlando, FL. “Circulating Tumor DNA as a Biomarker for Malignant Peripheral Nerve Sheath Tumors”.
- 5/2014 Speaker, Pediatric Brain Tumor Foundation Annual Meeting, San Antonio, TX
“Development of Novel Personalized Biomarkers for Individuals with Brain Tumors”.
- 7/2014 Speaker, 20th International Meeting on Brain Tumor Research and Therapy, Lake Tahoe NV
“Detection of circulating tumor DNA in early and late stage human malignancies”.
- 8/2014 Speaker, 2014 Next Generation Diagnostic Summit, Washington, DC
“Detection of circulating tumor DNA in early and late stage human malignancies”.
- 12/2014 Speaker, Biomed Valley Discoveries Investigator Meeting, Kansas City, KS
“Future Clinical Trials for *Clostridium noyi*-NT”.
- 2/2015 Speaker, Invited Guest Lecture at Illumina, San Diego, CA
“Detection of Cell Free Tumor Derived DNA in Human Malignancies”.
- 2/2015 Speaker, Pathology Grand Rounds, City of Hope Cancer Center, Los Angeles, CA
“Detection of Cell Free Tumor Derived DNA in Human Malignancies”.
- 2/2015 Keynote Speaker, 2015 Molecular Medicine Tri-Conference, Circulating Cell-Free DNA Meeting, San Francisco, CA
“Detection of Circulating Tumor DNA in Early and Late Stage Human Malignancies.
- 4/2015 Speaker, Annual Doris Duke Clinician Scientist Awardee Meeting, Chicago, IL
“Somatic Mutations of SUZ12 in Malignant Peripheral Nerve Sheath Tumors”
- 4/2015 Speaker, Neurosurgical Society of America, Newport Beach, CA.
“Prognostic Significance of the T gene SNP rs2305089 in Individuals with Spinal Column Chordoma”
- 5/2015 Speaker, American Association of Neurological Surgeons, Washington DC
“Somatic Mutations of SUZ12 in Malignant Peripheral Nerve Sheath Tumors”
- 5/2015 Speaker, Association for Collaborative Spine Research Meeting, Miami, FL
“Molecular Projects in Spinal Oncology”
- 6/2015 Speaker, 2015 Children’s Tumor Foundation Neurofibromatosis Conference, Monterey, CA
“Liquid Diagnostics: Biomarkers for the Neurofibromatoses”
- 8/2015 Speaker, 2015 Next Generation Diagnostic Summit, Washington DC
“Plasma Based Detection of Tumor Derived DNA in Human Malignancies”
- 4/2016 Speaker, A Woman’s Journey, Sarasota, FL
“Liquid biopsy for cancer”
- 4/2016 Speaker, A Woman’s Journey, St. Petersburg, FL
“Liquid biopsy for cancer”
- 4/2016 Speaker, A Woman’s Journey, Tampa, FL
“Liquid biopsy for cancer”
- 7/2016 Speaker, Chordoma Foundation Meeting, Boston MA
“Use of Circulating Tumor DNA as a Biomarker for Individuals with Chordoma”
- 7/2016 Speaker, 2nd qPCR and Digital PCR Congress, Philadelphia PA
“Tumor Derived Cell Free DNA as a Diagnostic Tool for Human Malignancies”
- 8/2016 Speaker, Methodist Hospital, Division of Thomas Jefferson Hospital, Philadelphia PA
“Surgical and Radiation Treatment Options for Brain Tumors”
- 9/2016 Speaker, AANS/CNS Tumor Satellite Symposium, San Diego CA
Tumor Derived DNA in the CSF as a Biomarker for CNS Neoplasms
- 10/2016 Panelist, Cowen and Company 5th Annual MedTools Unlocked Conference, New York, NY
“Liquid Biopsy & Beyond – Emerging Tools for Cancer Screening and Management”
- 2/2017 Visiting Professor, Weill-Cornell University School of Medicine, New York, NY
“Tumor Derived DNA as a Biomarker for Individuals with Cancer”.
- 2/2017 Speaker, Molecular Medicine Tri-Conference, San Francisco CA

- 2/2017 “Tumor Derived DNA as a Diagnostic Tool for Human Malignancies”
Speaker, A Woman’s Journey, Naples, FL
“Liquid biopsy for cancer”
- International*
- 7/2010 Speaker, 9th International Meeting, Updates in Neuro-Oncology Brain Tumor Symposium, Tuscany Italy
“Blood Based Biomarkers, Applications to Neuro-Oncology.”
- 06/2011 Speaker, Labatt Brain Tumour Research Centre Guest Lecture, University of Toronto
“Translating Genomics into Personalized Biomarkers”
- 03/2012 Speaker, AO Spine Knowledge Forum Steering Committee
“Spinal Tumor Biobanking”, Banff Canada
- 6/2014 Neurosurgical Society of America, St. Andrews, New Brunswick Canada
Speaker, “Translational molecular profiling of oligodendrogliomas”.
- 6/2014 Speaker, Neurosurgical Society of America, St. Andrews, New Brunswick Canada
“The promise of personalized cancer care”.
- 4/2015 Speaker, AOSpine North America Fellows Forum, Banff, Canada
“Circulating Tumor DNA for the Detection of Spinal Malignancies”
- 5/2015 Speaker, Global Spine Congress 2015, Buenos Aires Argentina
“Prognostic significance of T gene SNP rs2305089 in individuals with spinal column chordoma”.
- 5/2015 Speaker, Global Spine Congress 2015, Buenos Aires Argentina
“Outcomes following surgical intervention for impending and gross instability caused by multiple myeloma in the spinal column”.
- 10/2015 Speaker, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Molecular studies associated with primary and metastatic lesions”
- 10/2015 Speaker, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Multidisciplinary management of spine metastases, to reduce morbidity and improve outcomes
- 10/2015 Moderator, Fourth Bologna-Budapest Spine Meeting on Tumors and Osteoporosis, Bologna, Italy
“Management of spine tumors”
- 4/2016 Speaker, Global Spine Congress 2016, Dubai, UAE
“Clinical Decision Making: Integrating Advances in the Molecular Understanding of Primary Spine and Metastatic Tumors”
- 4/2016 Moderator, Global Spine Congress 2016, Dubai, UAE
“Novel technologies in spine surgery”

OTHER PROFESSIONAL ACCOMPLISHMENTS

Posters

1. Levin ED and **Bettegowda C**. Nicotinic NMDA interactions with working and reference memory. Society for Neuroscience 23: 216, 1997.
2. Levin ED, **Bettegowda C et al.** AR-R 17779, an a7 nicotinic agonist improves learning and memory in rats. Society for Neuroscience 24: 183, 1998.
3. Haroun R, **Bettegowda C**, Li K and Brem H. Effects of Col-3, an anti-angiogenesis agent on rat brain endothelial cell proliferation. American Association of Neurological Surgeons San Francisco, CA 2000.
4. Haroun R, Li K, **Bettegowda C**, Crumpler E, Landa J and Brem H. *In vivo* toxicity study of topoisomerase II inhibitor 9-chloro-2-methyl-ellipticinium acetate via local intracranial delivery. American Association of Neurological Surgeons. San Francisco, CA 2000.
5. Mehta V, **Bettegowda C**, Jallo G. Intramedullary tumoral calcinosis. American Association of Neurological Surgeons, Section on Pediatric Neurosurgery, December 2009.
6. Mehta V, **Bettegowda C**, Jallo G. Intramedullary tumoral calcinosis. AANS/CNS Section on Pediatric Neurosurgery, December 2009.
7. Mehta V, **Bettegowda C**, Jallo G, Ahn E. Impact of tethered cord release on symptoms of Chiari II malformation in children born with a myelomeningocele. Congress of Neurological Surgeons Annual Meeting, San Francisco, October 2010.
8. Ononiwu C, Mehta V, **Bettegowda C**, Jallo G. Pediatric Spinal Glioblastoma Multiforme. Congress of Neurological Surgeons Annual Meeting. Washington, DC, October 2011.

9. Fisher C, Boriani S, Varga PP, Rhines LD, Bilsky MH, Dekutoski MB, Fehlings MG, Reynolds JJ, Williams RP, Chou D, Berven S, Quraishi NA, **Bettegowda C**, Gokaslan ZL. A novel model for rare and often neglected neoplastic conditions. *Global Spine Congress 2013*, Hong Kong, April 4-6, 2013.
10. Lo L, Puvanesarajah V, Germscheid N, Chou D, Fisher C, Rhines LD, Williams RP, Boriani S, Gokaslan ZL, **Bettegowda C**. Aneurysmal Bone Cysts Of The Spine: Treatment Options And Considerations. AANS/CNS Section On Disorders Of The Spine And Peripheral Nerves Annual Meeting. Orlando, FL, USA March 5-8, 2014.
11. **Bettegowda C**, Sausen M, Leary R, Kinde I, Agrawal N, Bartlett B, Wang H, Lubber B, Kinzler K, Vogelstein B, Papadopoulos N, Diaz L. Detection of circulating tumor DNA in early and late stage human malignancies. American Association of Cancer Researchers April 2014.
12. Varga, P, Fisher C, Rhines L, Gokaslan Z, Boriani S, Lazaray A, Wang WL, Germscheid N, Yip S, **Bettegowda C**. Prognostic significance of T gene SNP rs2305089 in Individuals with Spinal Column Chordoma. American Association of Cancer Researchers April 2014
13. Fisher CG, Versteeg A, Boriani S, Varga PP, Dekutoski MB, Gokaslan ZL, Williams RP, Reynolds JJ, Fehlings MG, **Bettegowda C**, Kawahara N, Rhines LD. Chondrosarcomas of the spine: prognostic variables for local recurrence and mortality in a multicenter study. 82nd American Association of Neurological Surgeons Annual Scientific Meeting, San Francisco, CA, USA, April 5-9, 2014.
14. Rhines LD, Dirks MS, Boriani S, Luzzati A, Fehlings MG, Fisher CG, Dekutoski MB, Williams R, Quraishi NA, Gokaslan ZL, **Bettegowda C**, Kawahara N, Varga PP. Ewing's sarcoma of the spine: prognostic variables for recurrence and survival in surgically treated patients. 82nd American Association of Neurological Surgeons Annual Scientific Meeting, San Francisco, CA, USA, April 5-9, 2014.
15. Clarke M, Molina C, Fourny D, Fisher C, Gokaslan Z, Schmidt M, Rhines L, Fehlings M, Laufer I, Patel S, Rampersaud R, Reynolds J, Chou D, **Bettegowda C**, Mendel E, Weber M, Sciubba D. Systematic Review of Surgical Treatment Outcomes of Prostate Metastases to the Spine. *Global Spine Congress 2015*, Buenos Aires, Argentina, May 20-23, 2015.
16. Quraishi NA, Boriani S, Varga P, Luzzati A, Gokaslan ZL, Fehlings MG, Fisher C, Dekutoski M, Rhines L, Reynolds J, **Bettegowda C**, Kawahara N, Williams R. A multi-center retrospective cohort study of spinal osteoid osteomas: surgical treatment and local recurrence results. 82nd American Association of Neurological Surgeons Annual Scientific Meeting, San Francisco, CA, USA, April 5-9, 2014.
17. Varga PP, Macki M, Bydon M, Boriani S, Fisher CG, Rhines LD, Chou D, Luzzati A, Reynolds JJ, Kawahara N, **Bettegowda C**, Sciubba D, Wolinsky JP, Gokaslan ZL. Long-term outcomes in primary spinal osteochondroma: a multicenter center study of 27 patients. 82nd American Association of Neurological Surgeons Annual Scientific Meeting, San Francisco, CA, USA, April 5-9, 2014.
18. Zamorano JJ, Fehlings M, Nater A, Tetreault L, Varga P, Gokaslan Z, Boriani S, Fisher C, Rhines L, **Bettegowda C**, Kawahara N, Chou D. Local recurrence risk factors after surgical resection of spine schwannomas: analysis of 169 patients from a multicenter international database. 82nd American Association of Neurological Surgeons Annual. San Francisco, CA, USA, April 5-9, 2014.
19. Quraishi NA, Boriani S, Varga P, Luzzati A, Gokaslan ZL, Fehlings MG, Fisher C, Dekutoski M, Rhines L, Reynolds J, **Bettegowda C**, Kawahara N, Williams R. A multi-center retrospective cohort study of spinal osteoid osteomas: surgical treatment and local re-currence results. *BritSpine*, Warwick, U.K., April 2014.

Podium Presentations

1. Than KD, Woodworth GF, **Bettegowda C**, MCGirt MJ, Jallo GI, Rigamonti D. Adolescent Age Is An Independent Predictor Of Improved Outcome Following Endoscopic Third Ventriculostomy For The Treatment Of Hydrocephalus Congress of Neurological Surgeons Annual Meeting. San Diego CA, October 2007.
2. Sciubba DM, Mcloughlin GS, McGirt MJ, **Bettegowda C**, Jagannathan J, Fourny DR, Gokaslan ZL, Wolinsky JP, Witham TF. Postoperative Infection Of The Instrumented Spine: A Review Of 1,332 Procedures Over 5 Years. AANS/CNS Section On Disorders Of The Spine And Peripheral Nerves Annual Meeting. Phoenix, AZ, USA March 11-14, 2014.
3. Liauw J, Hoang S, **Bettegowda C**, Frazier JL, MCGirt MJ, Lim M. Glomus Jugulare Tumors: Radiosurgical Treatment And Outcomes. Congress Of Neurological Surgeons Annual Meeting. New Orleans, LA Oct 24-29, 2009.
4. **Fisher C**, Boriani S, Varga P, Fehlings M, Bilsky M, Dekutoski M, Luzzati A, Williams R, Berven S, Chou D, Quraishi N, Rhines L, **Bettegowda C**, Gokaslan Z. A novel scientific model for rare and often neglected

- neoplastic conditions. 13th Annual Scientific Conference of the Canadian Spine Society, Mont-Tremblant, QC, Canada, February 27-March 2, 2013.
5. Fisher C, Goldschlager T, Boriani S, Varga P, Fehlings MG, Bilsky M, Dekutoski M, Luzzati A, Williams R, Berven S, Chou D, Quraishi N, Rhines L, **Bettegowda C**, Gokaslan Z. A novel scientific model for rare and often neglected neoplastic conditions. 11th Annual AOSpine North America Fellows Forum, Banff, AB, Canada, March 14-16, 2013.
 6. Fisher C, Boriani S, Varga PP, Fehlings M, Bilsky M, Dekutoski M, Luzzati A, Williams R, Berven S, Chou D, Reynolds J, Quraishi N, Rhines L, **Bettegowda C**, Gokaslan Z. A novel evidence based model for rare and often neglected neoplastic conditions. Third Charite Spine Tumor Days, Berlin Germany, May 31-June 1, 2013.
 20. Fisher C, Fehlings M, Bilsky M, Dekutoski M, Luzzati A, Williams R, Berven S, Quraishi N, Rhines L, **Bettegowda C**, Gokaslan Z. A novel scientific model for rare and often neglected neoplastic conditions: AOSpine knowledge forum tumor international dataset for primary tumors of the spine. 20th International Meeting on Advanced Spine Techniques, Vancouver, BC, Canada, July 10-13, 2013.
 21. Reynolds J, Fisher C, Boriani S, Varga PP, Fehlings MG, Bilsky MH, Dekutoski MB, Rhines L, **Bettegowda C**, Gokaslan Z. A novel scientific model for rare and often neglected neoplastic conditions. EuroSpine 2013, Liverpool, UK, October 2-4, 2013.
 22. Fisher C, Boriani S, Varga PP, Fehlings MG, Bilsky MH, Dekutoski MB, Williams RP, Berven SH, Chou D, Reynolds JJ, Quraishi NA, Rhines LD, **Bettegowda C**, Gokaslan ZL. A novel scientific model for rare and often neglected neoplastic conditions: AOSpine International Knowledge Forum Tumor database for primary tumors of the spine. North American Spine Society (NASS) 28th Annual Meeting, New Orleans, LA, USA, October 9-12, 2013.
 23. Varga P, Macki M, Bydon M, Sciubba D, Wolinsky JP, Boriani S, **Bettegowda C**, Chou D, Fisher CG, Luzzati A, Reynolds JJ, Germscheid NM, Zadnik P, Rhines LD, Gokaslan ZL, AOSpine Knowledge Forum Tumor. Long-term outcomes in primary, spinal osteochondroma: a multicenter study of 27 patients. Association for Collaborative Spine Research Meeting, San Diego, CA, USA, January 30-February 1, 2014.
 24. Fisher CG, Boriani S, Varga PP, Rhines LD, Bilsky MH, Dekutoski MB, Fehlings MG, Reynolds J, Williams R, Chou D, Quraishi NA, **Bettegowda C**, Gokaslan ZL, AOSpine Knowledge Forum Tumor. The new frontier for research and management of primary tumors of the spine. Association for Collaborative Spine Research Meeting, San Diego, CA, USA, January 30-February 1, 2014
 25. Goldstein C, Varga P, Gokaslan Z, Boriani S, Luzzati A, Williams R, Rhines L, Fisher C, Chou D, Dekutoski M, Quraishi N, **Bettegowda C**, Kawahara N, Fehlings M. Hemangiomas of the spine: results of surgical management and prognostic variables for local recurrence and mortality in a multicenter study. Combined meeting with the Canadian Spine Society and the New Zealand Spine Society 2014, Lake Louise, AB, Canada, February 25-March 1, 2014.
 26. Fehlings M, Zamorano JJ, Nater A, Tetreault L, Varga P, Gokaslan Z, Boriani S, Fisher C, Rhines L, **Bettegowda C**, Kawahara N, Chou D. Local recurrence risk factors after surgical resection of spine schwannomas: analysis of 169 patients from a multicenter international database. Combined meeting with the Canadian Spine Society and the New Zealand Spine Society 2014, Lake Louise, AB, Canada, February 25-March 1, 2014.
 27. Goldstein C, Varga P, Gokaslan Z, Boriani S, Luzzati A, Williams R, Rhines L, Fisher C, Chou D, Dekutoski M, Quraishi N, **Bettegowda C**, Kawahara N, Fehlings M. Hemangiomas of the spine: results of surgical management and prognostic variables for local recurrence and mortality in a multicenter study. Combined meeting with the Canadian Spine Society and the New Zealand Spine Society 2014, Lake Louise, AB, Canada, February 25-March 1, 2014.
 28. Fisher CG, Versteeg A, Boriani S, Varga PP, Dekutoski MB, Gokaslan ZL, Williams RP, Reynolds JJ, Fehlings MG, **Bettegowda C**, Kawahara N, Rhines LD. Chondrosarcomas of the spine: prognostic variables for local recurrence and mortality in a multicenter study. Combined meeting with the Canadian Spine Society and the New Zealand Spine Society 2014, Lake Louise, AB, Canada, February 25-March 1, 2014.
 29. Goldstein CL, Varga , Gokaslan ZL, Boriani S, Luzzati A, Williams RP, Rhines LD, Fisher C, Chou D, Dekutoski MD, Quraishi NA, **Bettegowda C**, Kawahara N, Fehlings MG. Hemangiomas Of The Spine: Results Of Surgical Management And Prognostic Variables For Local Recurrence And Mortality In A Multicenter Study. AANS/CNS Section On Disorders Of The Spine And Peripheral Nerves Annual Meeting. Orlando, FL, USA March 5-8, 2014.

30. Puvanesarajah V, Lo L, Liauw J, **Bettegowda C**, Sciubba DM, Wolinsky JP, Gokaslan ZL, Rigamonti D, Redmond K, Kleinberg L, Lim M. The Johns Hopkins Hospital Initial Experience With Stereotactic Radiosurgery Of Spinal Tumors. AANS/CNS Section On Disorders Of The Spine And Peripheral Nerves Annual Meeting. Orlando, FL, USA March 5-8, 2014.
31. Zadnik P, Varga P, **Bettegowda C**, Fisher C, Fehlings M, Quraishi N, Luzzati A, Rhines L, Wolinsky JP, Sciubba D, Dekutoski M, Kawahara N, Boriani S, Gokaslan Z. Survival and recurrence following resection of chordoma in the mobile spine: results of 171 patients from the AOSpine Primary Tumor Knowledge Forum. 82nd American Association of Neurological Surgeons Annual Scientific Meeting, San Francisco, CA, USA, April 5-9, 2014.
32. Williams R, Sowman B, Boriani S, Varga P, Luzzati A, Gokaslan Z, Fehlings M, Fisher C, Dekutoski M, Rhines L, Reynolds J, **Bettegowda C**, Kawahara N, Quraishi NA. Spinal osteoid osteoma: a multicentre retrospective cohort study comparison of results with appendicular osteoid osteoma. Spine Society of Australia Annual Scientific Meeting, Brisbane, Australia, April 10-12, 2014.
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