

**BIOGRAPHICAL SKETCH**

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NAME Benita Tamrazi	POSITION TITLE Assistant Professor of Clinical Radiology Children's Hospital Los Angeles		
eRA COMMONS USER NAME (credential, e.g., agency login)			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
San Jose State University	BS	05/03	Systems Physiology
Medical College of Wisconsin	MD	05/07	Medical Doctorate
Yale New Haven Medical Center/Greenwich Hospital		06/08	Internship, Internal Medicine
University of Rochester Medical Center		06/12	Residency, Diagnostic Radiology
University of California San Francisco		06/13	Fellowship, Neuroradiology
University of California San Francisco		06/14	Clinical Instructor, Neuroradiology

**A. Personal Statement**

As the neuroradiologist in charge of imaging protocols and interpretation for multiple brain tumor consortia at CHLA, I am in the unique position of providing critical information to the neuro-oncologists and neurosurgeons regarding the preoperative assessment of brain tumors as well as identifying sequela of treatment effect on follow up imaging in the patients that survive long term. My research experience in pediatric brain tumor imaging, including treatment effect and gadolinium deposition in pediatric patients with brain tumors, as well as my clinical experience in pediatric neuroradiology, will be helpful in ensuring the success of radiogenomics focused research projects. Specifically my research has focused on radiogenomics work with advanced imaging as well as imaging of post treatment changes of the brain in the setting of brain tumors with key publications listed below.

1. **Tamrazi B**, Venneti S, Margol A, Hawes D, Cen SY, Nelson MD, Judkins A, Biegel J, Bluml S. Pediatric atypical teratoid/rhabdoid tumors of the brain: identification of metabolic subgroups using in vivo 1H-MR spectroscopy. *American Journal of Neuroradiology*. May; 40(5): 872-877, 2019. Epub 4 Apr 2019. PMID# 30948375
2. **Tamrazi B**, Pekmezci M, Aboian M, Tihan T, Glastonbury CM. Apparent diffusion coefficient and pituitary macroadenomas: pre operative assessment of tumor atypia. *Pituitary* 2016: doi: 10.1007/s11102-016-0759-5.
3. **Tamrazi B**, Nelson MD and Bluml S. MRS of Pilocytic Astrocytoma: the peak at 2 ppm may not be NAA. *Magnetic Resonance in Medicine* 2016: doi: 10.1002/mrm.26374.
4. **Tamrazi B**, Nguyen B, Liu CJ, Azen CG, Nelson MB, Dhall G, Nelson MD. Changes in signal intensity of the dentate nucleus and globus pallidus in pediatric patients: impact of brain irradiation and presence of primary brain tumors independent of linear gadolinium based contrast agent administration. *Radiology*. 2017 Nov 30;171850. doi: 10.1148/radiol.2017171850.
5. **Tamrazi B**, Liu CJ, Cen SY, Nelson MB, Dhall G, Nelson MD. Brain irradiation and gadobutrol administration in pediatric patients with brain tumors: effect on MRI brain signal intensity. *Radiology*. Oct; 289(1):188-94, 2018. PMID# 29989524

## B. Positions and Honors

### Positions and Employment

07/14 - Present Assistant Professor of Clinical Radiology, Pediatric Neuroradiology, Department of Radiology, Children's Hospital Los Angeles  
07/13 - 06/14 Clinical Instructor, Department of Radiology, Division of Neuroradiology, University of California San Francisco

### Other Experience and Professional Memberships

2008 - present Member, Radiological Society of North America  
2012 - present Member, American Society of Neuroradiology  
2014 - present Member, The Western Neuroradiological Society  
2016 - present Member, American Society of Pediatric Neuroradiology

### Honors:

2010 Educational Exhibit Certificate of Merit Award- This is Your Brain on Drugs: Imaging of Drug Related CNS Changes, Radiological Society of North America  
Scientific Exhibit Magna Cum Laude Award- Imaging of Pediatric Hearing Loss, American Society of Neuroradiology  
2006 Eugene Harold Scholarship - Medical College of Wisconsin  
2003 Magna Cum Laude - San Jose State University  
2001 Howard Hughes Undergraduate Research Fellowship- University of Pittsburgh  
The Honor Society of Phi Kappa Phi- San Jose State University  
2000 Golden Key Honor Society  
1998-2003 President's Scholar Award- San Jose State University  
1998-2003 Dean's List- San Jose State University

## C. Contributions to Science

1. My early publications focused on imaging characterization of brain tumors, some of which included advanced techniques such as MR spectroscopy to investigate the underlying metabolic changes associated with brain tumors and how this can potentially help predict not only the diagnosis of the tumor but also changes related to treatment effect/response to treatment. These publications have not only contributed to the understanding of brain tumor imaging and characterization, but they have also demonstrated that advanced imaging techniques can be applied to changes of the brain that accompany treatment effect beyond the characterization of the tumor alone.

- a. **Tamrazi B**, Pekmezci M, Aboian M, Tihan T, Glastonbury CM. Apparent diffusion coefficient and pituitary macroadenomas: pre operative assessment of tumor atypia. *Pituitary* 2016: doi: 10.1007/s11102-016-0759-5.
- b. **Tamrazi, B**. Advanced Techniques and Applications in MR Spectroscopy for Pediatric Patients. *J Pediatr Neurol*. 2017 DOI: 10.1055/s-0037-1604217.

2. In addition to the contributions described above, I have also recently focused my research efforts on the imaging of treatment effect as well as imaging changes in pediatric brain tumor patients that are associated with gadolinium deposition.

- a. **Tamrazi B**, Liu CJ, Cen SY, Nelson MB, Dhall G, Nelson MD. Brain irradiation and gadobutrol administration in pediatric patients with brain tumors: effect on MRI brain signal intensity. *Radiology*. Oct; 289(1):188-94, 2018. PMID# 29989524

- b. **Tamrazi B**, Nguyen B, Liu CJ, Azen CG, Nelson MB, Dhall G, Nelson MD. Changes in signal intensity of the dentate nucleus and globus pallidus in pediatric patients: impact of brain irradiation and presence of primary brain tumors independent of linear gadolinium based contrast agent administration. *Radiology*. 2017 Nov 30;171:1850. doi: 10.1148/radiol.2017171850.
- c. Roddy E, Sear K, Felton E, **Tamrazi B**, Gauvain K, Torkildson J, Del Buono B, Samuel D, Haas-Kogan A, Chen J, Goldsby RE, Banerjee A, Lupo JM, Molinaro AM, Fullerton HJ, Mueller S. Presence of cerebral microbleeds is associated with worse executive function in pediatric brain tumor survivors. *Journal of Neuro-Oncology* 2016: pii: now163. [Epub ahead of print].
- d. Nordstrom M, Sear K, **Tamrazi B**, Torkildson J, Gauvain K, Haas-Kogan DA, Chen J, Del Buono B, Banerjee A, Samuel D, Saloner D, Tlan B, Roddy E, Fullerton H, Mueller S. Large vessel arteriopathy after cranial radiation therapy in pediatric brain tumor survivors. *Journal of Child Neurology*, 2017 (in press).

3. I have also combined my clinical experience in neuroradiology with my imaging research experience and are participating in research that use advanced imaging techniques as well as conventional imaging techniques to answer clinically relevant questions involving pediatric brain tumors and patients with iron overload disease processes.

- a. Bush AM, Borzage MT, Choi S, Vaclavu L, **Tamrazi B**, Nederveen AJ, Coates TD, Wood JC. Determinants of resting cerebral blood flow in sickle cell disease. *Am J Hematol* 2016: doi: 10.1002/ajh.24441.
- b. **Tamrazi B**, Nelson MD and Bluml S. Pineal region masses in pediatric patients. *Neuroimaging Clinics of North America*. 2017; 27: 85-97.
- c. Lamiman K, Nosrati JD, **Tamrazi B**, Olch A, Chang E, Wong KK, Kiehna EN. A quantitative analysis of craniopharyngioma cyst expansion during and after radiation therapy and surgical considerations. *JNS Focus*. 2016; 41:1-9.
- d. Bayliss J, Mukherjee P, Lu C, Jain S, Martinez D, Margol A, Pecmezci M, Chung L, McEachin R, Cieslik M, Garcia B, **Tamrazi B**, Larocca G, Santi M, Lewis P, Melnik A, Allis DC, Thompson CB, Chinnaiyan AM, Judkins AR, Venneti S. Lowered H3K27me3 and DNA hypomethylation similar to H3K27M gliomas define poorly prognostic pediatric posterior fossa ependymomas. *Science Translational Medicine*. 2016; 8: 1-13.
- e. Aboian MS, Solomon DA, Kline CN, Tong E, Gsutam A, Vardapetyan A, Li Y, Jordan CD, Felton E, Weinberg B, **Tamrazi B**, Braunstein S, Mueller S, Cha S. Diffusion characteristics of pediatric diffuse midline gliomas with histone H3 K27M mutation using apparent diffusion coefficient histogram analysis. *AJNR*, 2017 (in press).

### Complete List of Published Work in MyBibliography:

1. Anker AR, Ali A, Arendt HE, Cass SP, Cotter LA, Jian BJ, **Tamrazi B**, Yates BJ: Use of electrical vestibular stimulation to alter genioglossal muscle activity in awake cats. *Journal of Vestibular Research*. 13(1):1-8, 2003. PMID# 14646019
2. **Tamrazi B**, Mangla R and Almast J. Imaging of Pediatric Hearing Loss. *Neurographics*. 1: 66-73, 2011.
3. **Tamrazi B**, Almast J. Your Brain on Drugs: Imaging of Drug Related CNS Changes in the Central Nervous System. *RadioGraphics*. May-Jun; 32(3):701-19, 2012. PMID# 22582355
4. Wong K, Opimo AB, Olch AJ, All S, Waxer JF, Clark D, Cheng J, Chlebik A, Erdreich-Epstein A, Krieger MD, **Tamrazi B**, Dhall G, Finlay JL, Cheng E. Re-irradiation of recurrent pineal germ cell tumor with radiosurgery: report of two cases and review of literature. *Cureus*. Apr; 8(4):585, 2016. PMID# 27239400

5. Bush AM, Borzage MT, Choi S, Vaclavu L, **Tamrazi B**, Nederveen AJ, Coates TD, Wood JC. Determinants of resting cerebral blood flow in sickle cell disease. *American Journal of Hematology*. Sep; 91(9):912-17, 2016. PMID# 27263497
6. Roddy E, Sear K, Felton E, **Tamrazi B**, Gauvain K, Torkildson J, Del Buono B, Samuel D, Haas-Kogan A, Chen J, Goldsby RE, Banerjee A, Lupo JM, Molinaro AM, Fullerton HJ, Mueller S. Presence of cerebral microbleeds is associated with worse executive function in pediatric brain tumor survivors. *Neuro-Oncology*. Nov;18(11):1548-58, 2016. PMID# 27540084
7. Bayliss J, Mukherjee P, Lu C, Jain S, Martinez D, Margol A, Pecmezci M, Chung L, McEachin R, Cieslik M, Garcia B, **Tamrazi B**, Larocca G, Santi M, Lewis P, Melnik A, Allis DC, Thompson CB, Chinnaiyan AM, Judkins AR, Venneti S. Lowered H3K27me3 and DNA hypomethylation similar to H3K27M gliomas define poorly prognostic pediatric posterior fossa ependymomas. *Science Translational Medicine*. Nov; 8(366):1-13, 2016. PMID# 27881822
8. Lamiman K, Nosrati JD, **Tamrazi B**, Olch A, Chang E, Wong KK, Kiehna EN. A quantitative analysis of craniopharyngioma cyst expansion during and after radiation therapy and surgical considerations. *Neurosurgical Focus*. Dec; 41(6): E15, 2016. PMID# 27903114
9. **Tamrazi B**, Nelson MD and Bluml S. MRS of Pilocytic Astrocytoma: the peak at 2 ppm may not be NAA. *Magnetic Resonance in Medicine*. Aug; 78(2):452-6, 2017. PMID# 27529659
10. **Tamrazi B**, Pekmezci M, Aboian M, Tihan T, Glastonbury CM. Apparent diffusion coefficient and pituitary macroadenomas: pre-operative assessment of tumor atypia. *Pituitary*. Apr; 20(2):195-200, 2017. PMID# 27734275
11. Kiehna EN, Arnush MR, **Tamrazi B**, Hawes D, Gilles F, Robison NJ, Biegel JA. Novel FIG-ROS1 fusion in a pediatric glioblastoma multiforme survivor. *Journal of Neurosurgery, Pediatrics*. Jul; 20(1): 51-5, 2017. PMID# 28387643
12. Wu TW, **Tamrazi B**, Soleymani S, Seri I, Noori S. Hemodynamic changes during rewarming phase of whole body hypothermia therapy in neonates with hypoxic ischemic encephalopathy. *Journal of Pediatrics*. Jun; 197:68-74.e2, 2018. PMID# 29571928
13. Nordstrom M, Felton E, Sear K, **Tamrazi B**, Torkildson J, Gauvain K, Haas-Kogan DA, Chen J, Buono BD, Banerjee A, Samuel D, Saloner D, Tian B, Roddy E, Hess C, Fullerton H, Mueller S. Large vessel arteriopathy after cranial radiation therapy in pediatric brain tumor survivors. *Journal of Child Neurology*. Apr; 33(5): 359-66, 2018. PMID# 29575995
14. Cotter JA, Szymanski L, Karimov C, Boghossian L, Margol A, Shall G, **Tamrazi B**, Varaprasathan GI, Parham DM, Judkins AR, Biegel JA. Transmission of a TP53 germline mutation from unaffected male carrier associated with pediatric glioblastoma in his child and gestational choriocarcinoma in his female partner. *Cold Spring Harbor molecular case studies*. Apr; 4(2): pii: a002576, 2018. PMID# 29581140
15. Xu B, Chai Y, Galarza CM, Vu CQ, **Tamrazi B**, Gaonkar B, Macyszyn L, Coates TD, Lepore N, Wood JC. Orchestral fully convolutional networks for small lesion segmentation in brain MRI. *Proceedings IEEE International Symposium on Biomedical Imaging*. Apr: 889-892, 2018. Epub 2018 May 24. PMID# 30344893
16. Chai Y, Chen J, Galarza C, Sluman MA, Xu B, Vu CQ\*, Richard E, Mulder B, **Tamrazi B**, Lepore N, Mutsaerts HJMM, Wood JC. Cerebral blood flow and predictors of white matter lesions in adults with tetralogy of fallot. *Proceedings IEEE International Symposium on Biomedical Imaging*. Apr: 1309-1312, 2018. Epub 2018 May 24. PMID# 30344894

17. Wu TW, **Tamrazi B**, Hsu KH, Ho E, Reitman AJ, Borzage M, Bluml S, Wisnowski JL. Cerebral lactate concentration in neonatal hypoxic-ischemic encephalopathy: in relation to time, characteristic of injury, and serum lactate concentration. *Frontiers in Neurology*. May; 9:293, 2018. PMID# 29867713
18. D'Arco F, Culleton S, De Cocker LJJ, Mankad K, Davila J, **Tamrazi B**. Current concepts in radiologic assessment of pediatric brain tumors during treatment, part 1. *Pediatric Radiology*. Jul; 2018. PMID# 29980859
19. Borzage M, Ponrartana S, **Tamrazi B**, Gibbs W, Nelson MD, McComb JG, Bluml S. A new MRI tag-based method to non-invasively visualize cerebrospinal fluid flow. *Child's nervous system: ChNS : official journal of the International Society for Pediatric Neurosurgery*. Sep; 34(9):1677-82, 2018. PMID# 29876643
20. **Tamrazi B**, Nguyen B, Liu CJ, Azen CG, Nelson MB, Dhall G, Nelson MD. Changes in signal intensity of the dentate nucleus and globus pallidus in pediatric patients: impact of brain irradiation and presence of primary brain tumors independent of linear gadolinium-based contrast agent administration. *Radiology*. May; 287(2):452-60, 2018. PMID# 29189102
21. **Tamrazi B**, Liu CJ, Cen SY, Nelson MB, Dhall G, Nelson MD. Brain irradiation and gadobutrol administration in pediatric patients with brain tumors: effect on MRI brain signal intensity. *Radiology*. Oct; 289(1):188-94, 2018. PMID# 29989524
22. Miao X, Choi S, **Tamrazi B**, Chai Y\*, Vu CQ\*, Coates TD, Wood JC. Increased brain iron deposition in patients with sickle cell disease: an MRI quantitative mapping study. *Blood*. Oct; 132(15):1618-21, 2018. PMID# 30045839
23. **Tamrazi B**, Mankad K, Nelson M, D'Arco F. Current concepts and challenges in the radiologic assessment of brain tumors in children: part 2. *Pediatric Radiology*. Dec; 48(13):1844-60, 2018. PMID# 30215111
24. Murgai RR, **Tamrazi B**, Illingworth KD, Skaggs DL, Andras LM. Limited sequence MRI's for early onset scoliosis patients detected 100% of neural axis abnormalities while reducing MRI time by 68. *Spine*. Dec, 2018. PMID# 30540716
25. Juliano J, Melamed E, Christian E, **Tamrazi B**, Krieger MD. Imaging Features Predictive of Recurrence in Pediatric Intracranial Germ-Cell Tumors. *Pediatric Neurosurgery*. 54(3): 173-80, 2019. Epub 13 Mar 2019. PMID# 30865947
26. Tiwari N, **Tamrazi B**, Robison N, Krieger M, Ji J, Tian D. Unusual radiological and histological presentation of a diffuse leptomeningeal glioneuronal tumor (DLGNT) in a 13-year-old girl. *Child's nervous system: ChNS : official journal of the International Society for Pediatric Neurosurgery*. Feb, 2019. PMID# 30770994
27. Toll SA, Tran HN, Cotter J, Judkins AR, **Tamrazi B**, Biegel JA, Dhall G, Robison NJ, Waters K, Patel P, Cooper R, Margol AS. Sustained response of three pediatric BRAF<sup>V600E</sup> mutated high-grade gliomas to combined BRAF and MEK inhibitor therapy. *Oncotarget*. Jan; 10(4):551-7, 2019. PMID# 30728904
28. Chai Y, Bush AM, Coloigner J, Nederveen AJ, **Tamrazi B**, Vu CQ\*, Choi S, Coates TD, Lepore N, Wood C. White matter has impaired resting oxygen delivery in sickle cell patients. *American Journal of Hematology*. Jan, 2019. PMID# 30697803
29. **Tamrazi B**, Venneti S, Margol A, Hawes D, Cen SY, Nelson MD, Judkins A, Biegel J, Bluml S. Pediatric atypical teratoid/rhabdoid tumors of the brain: identification of metabolic subgroups using in vivo 1H-MR spectroscopy. *American Journal of Neuroradiology*. May; 40(5): 872-877, 2019. Epub 4 Apr 2019. PMID# 30948375

30. Fangusaro J, Onar-Thomas A, Young Poussaint T, Wu S, Ligon AH, Lindeman N, Banerjee A, Packer RJ, Kilburn LB, Goldman S, Pollack IF, Qaddoumi I, Jakacki RI, Fisher PG, Dhall G, Baxter P, Kreissman SG, Stewart DF, Jones DTW, Pfister SM, Vezina G, Stern JS, Panigrahy A, Patay Z, **Tamrazi B**, Jones JY, Hague SS, Enterline DS, Cha S, Fisher MJ, Doyle LA, Smith M, Dunkel IJ, Fouladi M. Selumetinib in paediatric patients with BRAF-Aberrant or neurofibromatosis type 1-associated recurrent, refractory, or progressive low-grade glioma: a multicenter, phase 2 trial. *The Lancet. Oncology*. Jul; 20(7): 1011-22, 2019. Epub 28 May 2019. PMID# 31151904
31. Kim JW, Shah SN, Green S, O'Fee J, **Tamrazi B**, Berry JL. Tumour size criteria for Group D and E eyes in the International Classification System for Retinoblastoma: effects on rates of globe salvage and high-risk histopathologic features. *Acta Ophthalmologica*. Aug, 2019. PMID# 31421017  
*Provided the neuroradiology review of anatomic imaging.*
32. Assaf RR, Levine M, Cheung C, **Tamrazi B**, Cotter JA, Bryant M, Kiehna EN. Case 1: An 11-year-old Girl with Depression and Electrolyte Disturbance. *Pediatrics in Review*. Aug; 40(8): 421-4, 2019. PMID# 31371635
33. Aboian MS, Tong E, Solomon DA, Kline C, Gautam A, Vardapetyan A, **Tamrazi B**, Li Y, Jordan CD, Felton E, Weinberg B, Braunstein S., Mueller S, Cha S. Diffusion characteristics of pediatric diffuse midline gliomas with histone H3 K27M mutation using apparent diffusion coefficient histogram analysis. *American Journal of Neuroradiology*. **IN PRESS**.

#### **D. Additional Information: Research Support and/or Scholastic Performance**

##### **Ongoing Research Support**

No active grants

##### **Completed Research Support**

Bayer Healthcare Grant	Tamrazi (PI)	07/01/16-07/01/18
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Evaluation of gadolinium deposition of the brain in pediatric patients.

Role: PI

Ian's Friends Foundation	Tamrazi (Co-PI)	09/01/16-08/31/18
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MRS-informed profiling and management of pediatric brain tumors

Role: Co-PI