

## BIOGRAPHICAL SKETCH

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NAME Felipe Fregni, MD, PhD, MMSc, MPH	POSITION TITLE Assistant Professor of Neurology, Harvard Medical School, Beth Israel Deaconess Medical Center		
eRA COMMONS USER NAME felipefregni			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Sao Paulo, Sao Paulo, Brazil	M.D.	1999	Medicine
University of Sao Paulo, Sao Paulo, Brazil	(Residency)	2003	Neurology
University of Sao Paulo, Sao Paulo, Brazil	Ph.D.	2004	Psychiatry/Neuroscience
Harvard Medical School, Boston, MA	M.M.Sc.	2006	Clinical Research
Harvard School of Public Health, Boston, MA	M.P.H.	2007	Clinical Effectiveness

### A. Positions and Honors

#### Positions

1997-1998 – Research Student, Sao Paulo University Medical School, Brazil  
1998-1999 - Intern, Medicine, Sao Paulo University, Brazil  
1999-2000 - Resident, Medicine, Sao Paulo University, Brazil  
2000-2002 - Resident, Neurology, Sao Paulo University, Brazil  
2002-2003 – Research Associate, Psychiatry Institute, Sao Paulo University, Brazil  
2003-2005 – Post-Doctoral Fellow, Laboratory for Magnetic Brain Stimulation, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA.  
2005-2007 – Instructor in Neurology, Harvard Medical School  
2006-present – Director of the Clinical Trials Network, Center for Noninvasive Brain Stimulation, Harvard Medical School  
2007-present – Instructor in Population and International Health, Harvard School of Public Health, Boston  
2007-present – Assistant Professor of Neurology, Harvard Medical School, Boston, USA  
2007-present – Member of the Committee on Admissions (COA) for the Scholars in Clinical Science Program (postdoctoral program), Harvard Medical School, Boston, USA

### B. Publications

#### **(53 publications selected from 102 peer-reviewed publications)**

1. Campos CR, **Fregni F**, Massaro AR. Pure Alexia and Hemianopia related to Dissection of the Internal Carotid Artery. *CerebroVascular Diseases* 2003; 15(1-2):151-2.
2. **Fregni F**, Conforto AB, Martin MG, Leite CC, Yamamoto FI, Scaff M. Magnetic resonance imaging of Wallerian degeneration in stroke. *Arch Neurol.* 2003;60(10):1466-7.
3. **Fregni F**, Santos CM, Myczkowski ML, Rigolino R, Gallucci-Neto J, Barbosa ER, Valente KD, Pascual-Leone A, Marcolin MA. Repetitive transcranial magnetic stimulation is as effective as fluoxetine in the treatment of depression in patients with Parkinson's disease. *J Neurol Neurosurg Psychiatry.* 2004;75(8):1171-4.
4. Pascual-Leone A, Amedi A, **Fregni F**, Merabet LB. The plastic human brain cortex. *Annu Rev Neurosci.* 2005;28:377-401.
5. **Fregni F**, Schachter SC, Pascual-Leone A. Transcranial magnetic stimulation treatment for epilepsy: can it also improve depression and vice versa? *Epilepsy Behav.* 2005;7(2):182-9.
6. Theoret H, Halligan E, Kobayashi M, **Fregni F**, Tager-Flusberg H, Pascual-Leone A. Impaired motor facilitation during action observation in individuals with autism spectrum disorder. *Curr Biol.* 2005;15(3):R84-5.
7. **Fregni F**, Monte-Silva KK, Oliveira MB, Freedman SD, Pascual-Leone A, Guedes RC. Lasting accelerative effects of 1 Hz and 20 Hz electrical stimulation on cortical spreading depression: relevance for clinical applications of brain stimulation. *Eur J Neurosci.* 2005;21(8):2278-84.
8. Mansur CG, **Fregni F**, Boggio PS, Riberto M, Gallucci-Neto J, Santos CM, Wagner T, Rigonatti SP, Marcolin MA, Pascual-Leone A. A sham stimulation-controlled trial of rTMS of the unaffected hemisphere in stroke patients. *Neurology.* 2005;64(10):1802-4.

9. **Fregni F**, Boggio PS, Nitsche M, Bormpohl F, Antal A, Feredoes E, Marcolin MA, Rigonatti SP, Silva MT, Paulus W, Pascual-Leone A. Anodal transcranial direct current stimulation of prefrontal cortex enhances working memory. *Exp Brain Res*. 2005;166(1):23-30.
10. **Fregni F**, Boggio PS, Mansur CG, Wagner T, Ferreira MJ, Lima MC, Rigonatti SP, Marcolin MA, Freedman SD, Nitsche MA, Pascual-Leone A. Transcranial direct current stimulation of the unaffected hemisphere in stroke patients. *Neuroreport*. 2005;16(14):1551-5.
11. **Fregni F**, DaSilva D, Potvin K, Ramos-Estebanez C, Cohen D, Pascual-Leone A, Freedman SD. Treatment of chronic visceral pain with brain stimulation. *Ann Neurol*. 2005;58(6):971-2.
12. **Fregni F**, Simon DK, Wu A, Pascual-Leone A. Non-invasive brain stimulation for Parkinson's disease: a systematic review and meta-analysis of the literature. *J Neurol Neurosurg Psychiatry*. 2005;76(12):1614-23.
13. **Fregni F**, Boggio PS, Bormpohl F, Maia F, Rigonatti SP, Barbosa ER, Pascual-Leone A. Immediate placebo effect in Parkinson's disease - is the subjective relief accompanied by objective improvement? *Eur Neurol*. 2006;56(4):222-9.
14. Patrizi F, Freedman SD, Pascual-Leone A, **Fregni F**. Novel therapeutic approaches to the treatment of chronic abdominal visceral pain. *ScientificWorldJournal*. 2006;6:472-90.
15. Bormpohl F, **Fregni F**, Boggio PS, Thut G, Northoff G, Otachi PT, Rigonatti SP, Marcolin MA, Pascual-Leone A. Effect of low-frequency transcranial magnetic stimulation on an affective go/no-go task in patients with major depression: role of stimulation site and depression severity. *Psychiatry Res*. 2006;141(1):1-13.
16. Dias AE, Barbosa ER, Coracini K, Maia F, Marcolin MA, **Fregni F**. Effects of repetitive transcranial magnetic stimulation on voice and speech in Parkinson's disease. *Acta Neurol Scand*. 2006;113(2):92-9.
17. **Fregni F**, Thome-Souza S, Nitsche MA, Freedman SD, Valente KD, Pascual-Leone A. A controlled clinical trial of cathodal DC polarization in patients with refractory epilepsy. *Epilepsia*. 2006;47(2):335-42.
18. **Fregni F**, Boggio PS, Nitsche MA, Marcolin MA, Rigonatti SP, Pascual-Leone A. Treatment of major depression with transcranial direct current stimulation. *Bipolar Disord*. 2006;8(2):203-4.
19. Wagner T, **Fregni F**, Eden U, Ramos-Estebanez C, Grodzinsky A, Zahn M, Pascual-Leone A. Transcranial magnetic stimulation and stroke: a computer-based human model study. *Neuroimage*. 2006;30(3):857-70.
20. Liebetanz D, **Fregni F**, Monte-Silva KK, Oliveira MB, Am\_ncio-dos-Santos A, Nitsche MA, Guedes RC. After-effects of transcranial direct current stimulation (tDCS) on cortical spreading depression. *Neurosci Lett*. 2006;398(1-2):85-90.
21. **Fregni F**, Boggio PS, Lima MC, Ferreira MJ, Wagner T, Rigonatti SP, Castro AW, Souza DR, Riberto M, Freedman SD, Nitsche MA, Pascual-Leone A. A sham-controlled, phase II trial of transcranial direct current stimulation for the treatment of central pain in traumatic spinal cord injury. *Pain*. 2006;122(1-2):197-209.
22. **Fregni F**, Boggio PS, Valle AC, Otachi P, Thut G, Rigonatti SP, Marcolin MA, Fecteau S, Pascual-Leone A, Fiore L, Valente K. Homeostatic effects of plasma valproate levels on corticospinal excitability changes induced by 1Hz rTMS in patients with juvenile myoclonic epilepsy. *Clin Neurophysiol*. 2006;117(6):1217-27.
23. **Fregni F**, Ono CR, Santos CM, Bormpohl F, Buchpiguel C, Barbosa ER, Marcolin MA, Pascual-Leone A, Valente KD. Effects of antidepressant treatment with rTMS and fluoxetine on brain perfusion in PD. *Neurology*. 2006;66(11):1629-37.
24. **Fregni F**, Boggio PS, Nitsche MA, Rigonatti SP, Pascual-Leone A. Cognitive effects of repeated sessions of transcranial direct current stimulation in patients with depression. *Depress Anxiety*. 2006;23(8):482-4.
25. **Fregni F**, Boggio PS, Valle AC, Rocha RR, Duarte J, Ferreira MJ, Wagner T, Fecteau S, Rigonatti SP, Riberto M, Freedman SD, Pascual-Leone A. A sham-controlled trial of a 5-day course of repetitive transcranial magnetic stimulation of the unaffected hemisphere in stroke patients. *Stroke*. 2006;37(8):2115-22.
26. Bormpohl F, Pascual-Leone A, Amedi A, Merabet LB, **Fregni F**, Gaab N, Alsop D, Schlaug G, Northoff G. Attentional modulation of emotional stimulus processing: An fMRI study using emotional expectancy. *Hum Brain Mapp*. 2006;27(8):662-77.
27. Boggio PS, Castro LO, Savagim EA, Braitte R, Cruz VC, Rocha RR, Rigonatti SP, Silva MT, **Fregni F**. Enhancement of non-dominant hand motor function by anodal transcranial direct current stimulation. *Neurosci Lett*. 2006;404(1-2):232-6.
28. **Fregni F**, Marcondes R, Boggio PS, Marcolin MA, Rigonatti SP, Sanchez TG, Nitsche MA, Pascual-Leone A. Transient tinnitus suppression induced by repetitive transcranial magnetic stimulation and transcranial direct current stimulation. *Eur J Neurol*. 2006;13(9):996-1001.

29. **Fregni F**, Otachi PT, Do Valle A, Boggio PS, Thut G, Rigonatti SP, Pascual-Leone A, Valente KD. A randomized clinical trial of repetitive transcranial magnetic stimulation in patients with refractory epilepsy. *Ann Neurol*. 2006;60(4):447-55.
30. **Fregni F**, Boggio PS, Santos MC, Lima M, Vieira AL, Rigonatti SP, Silva MT, Barbosa ER, Nitsche MA, Pascual-Leone A. Noninvasive cortical stimulation with transcranial direct current stimulation in Parkinson's disease. *Mov Disord*. 2006;21(10):1693-702.
31. **Fregni F**, Pascual-Leone A. Hand motor recovery after stroke: tuning the orchestra to improve hand motor function. *Cogn Behav Neurol*. 2006;19(1):21-33.
32. Boggio PS, Ferrucci R, Rigonatti SP, Covre P, Nitsche M, Pascual-Leone A, **Fregni F**. Effects of transcranial direct current stimulation on working memory in patients with Parkinson's disease. *J Neurol Sci*. 2006;249(1):31-8.
33. **Fregni F**, Gimenes R, Valle AC, Ferreira MJ, Rocha RR, Natalle L, Bravo R, Rigonatti SP, Freedman SD, Nitsche MA, Pascual-Leone A, Boggio PS. A randomized, sham-controlled, proof of principle study of transcranial direct current stimulation for the treatment of pain in fibromyalgia. *Arthritis Rheum*. 2006;54(12):3988-98.
34. **Fregni F**, Marcolin MA, Myczkowski M, Amiaz R, Hasey G, Rumi DO, Rosa M, Rigonatti SP, Camprodon J, Walpoth M, Heaslip J, Grunhaus L, Hausmann A, Pascual-Leone A. Predictors of antidepressant response in clinical trials of transcranial magnetic stimulation. *Int J Neuropsychopharmacol*. 2006;9(6):641-54.
35. **Fregni F**, Liebetanz D, Monte-Silva KK, Oliveira MB, Santos AA, Nitsche MA, Pascual-Leone A, Guedes RC. Effects of transcranial direct current stimulation coupled with repetitive electrical stimulation on cortical spreading depression. *Exp Neurol*. 2007;204(1):462-6.
36. Rosa MA, Rosa MO, Marcolin MA, **Fregni F**. Cardiovascular effects of anesthesia in ECT: a randomized, double-blind comparison of etomidate, propofol, and thiopental. *J ECT*. 2007;23(1):6-8.
37. Wagner T, **Fregni F**, Fecteau S, Grodzinsky A, Zahn M, Pascual-Leone A. Transcranial direct current stimulation: A computer-based human model study. *Neuroimage*. 2007;35(3):1113-1124.
38. **Fregni F**, Freedman S, Pascual-Leone A. Recent advances in the treatment of chronic pain with non-invasive brain stimulation techniques. *Lancet Neurol*. 2007;6(2):188-91.
39. **Fregni F**, Pascual-Leone A, Freedman SD. Pain in chronic pancreatitis: A salutogenic mechanism or a maladaptive brain response? *Pancreatol*. 2007; 7:411-422.
40. Boggio PS, Berman F, Vergara AO, Muniz AL, Nahas FH, Leme PB, Rigonatti SP, **Fregni F**. Go-no-go task performance improvement after anodal transcranial DC stimulation of the left dorsolateral prefrontal cortex in major depression. *J Affect Disord*. 2007; 101(1-3):91-8.
41. Cappelletti M, Bart H, **Fregni F**, Speike E, Pascual-Leone A. rTMS over the intraparietal sulcus disrupts numerosity processing. *Exp Brain Res*. 2007; 179(4):631-42.
42. Gross M, Nakamura L, Pascual-Leone A, **Fregni F**. Has rTMS treatment for depression improved? A systematic review and meta-analysis comparing the recent versus the earlier rTMS studies. *Acta Psychiatrica Scandinavica*. 2007; 116(3):165-73.
43. Valle AC, Dionisio K, Pitskel N, Orsati F, Ferreira MJ, Lima MC, Rigonatti SP, Pascual-Leone A, Boggio PS, **Fregni F**. Low and high-frequency repetitive transcranial magnetic stimulation for the treatment of spasticity. *Developmental medicine and child neurology*. 2007; 49(7):534-8..
44. **Fregni F**, Orsati F, Pedrosa W, Fecteau S, Tome FA, Nitsche MA, Mecca T, Macedo EC, Pascual-Leone A, Boggio PS. Transcranial direct current stimulation of the prefrontal cortex modulates the desire for specific foods. *Appetite*; 2007 in press.
45. Boggio PS, Nunes A, Rigonatti S, Nitsche M, Pascual-Leone A, **Fregni F**. Repeated sessions of noninvasive brain DC stimulation is associated with motor function improvement in stroke patients. *Restor Neurol Neurosci*. 2007; in press.
46. **Fregni F**, Liguori P, Fecteau S, Nitsche M, Pascual-Leone A, Boggio PS. Cortical Stimulation of the Prefrontal Cortex With Transcranial DC Stimulation reduces Smoking Cue-Provoked Craving: A Randomized, Sham-Controlled Study. *Journal of Clinical Psychiatry*. 2007;in press.
47. Silva G, Miksad R, Freedman SF, Pascual-Leone AP, Jain S, Gomes DL, AMancio EJ, Boggio PS, Correa CF, **Fregni F**. Treatment of Cancer Pain with Noninvasive Brain Stimulation. *J Pain Symptom Management* 2007; in press.
48. Cardoso EF, **Fregni F**, Martins Maia F, Boggio PS, Luis Myczkowski M, Coracini K, Lopes Vieira A, Melo LM, Sato JR, Antonio Marcolin M, Rigonatti SP, Cruz AC, Reis Barbosa E, Amaro E. rTMS treatment for

- depression in Parkinson's disease increases BOLD responses in the left prefrontal cortex. *Int J Neuropsychopharmacol.* 2007; in press.
49. Roizenblatt S, **Fregni F**, Gimenez R, Wetzel T, Rigonatti SP, Tufik S, Boggio PS, Valle AC. Site-specific effects of transcranial direct current stimulation on sleep and pain in fibromyalgia: a randomized, sham-controlled study. *Pain Practice*, in press.
  50. **Fregni F**, Pascual-Leone A. Technology insight: noninvasive brain stimulation in neurology-perspectives on the therapeutic potential of rTMS and tDCS. *Nature Clin Pract Neurol.* 2007 Jul;3(7):383-93.
  51. Fecteau S, Pascual-Leone A, Zald D, Liguori P, Theoret H, Boggio P, **Fregni F**. Activation of prefrontal cortex by transcranial direct current stimulation reduces appetite for risk during ambiguous decision-making. *Journal of Neuroscience.* 2007;in press.
  52. Boggio PS, Rigonatti PS, Myczkowski ML, Nitsche MA, Pascual-Leone A, **Fregni F**. A randomized double-blind clinical trial on the efficacy of cortical DC stimulation in the treatment of major depression. *International Journal of Neuropsychopharmacology.* 2007; 25(2):123-9.
  53. Rigonatti SP, Boggio PS, Myczkowski ML, Otta E, Fiquer JT, Ribeiro RB, Nitsche MA, Pascual-Leone A, **Fregni F**. Transcranial direct stimulation and fluoxetine for the treatment of depression. *Eur Psychiatry.* 2007; in press.

### C. Research Support - current

1. NIH RO3 (DK071851-01) 6/1/2005-5/31/2008  
 Project: rTMS for pain in chronic pancreatitis (The goal of this project is to collect preliminary data on therapeutic effects of rTMS in chronic pancreatitis and its mechanisms of action using MR spectroscopy)  
 P.I. – Steven D. Freedman (Beth Israel Deaconess Medical Center)  
 Role – Co-investigator
  
2. CIMIT (Center for Integration of Medicine and Innovative Technology) 10/1/2007 – 9/30/2008  
 Project - Anticonvulsive and antiepileptic properties of transcranial direct current stimulation (tDCS) in an animal seizure model (the goal of this project is to use an animal model of epilepsy to investigate the antiepileptic effects of cortical DC stimulation and its mechanisms of action)  
 P.I. – Felipe Fregni (Beth Israel Deaconess Medical Center)
  
3. CIMIT (Center for Integration of Medicine and Innovative Technology) 10/1/2007 – 9/30/2008  
 Project - To assess the feasibility of a novel method - Direct Current (DC) carotid body stimulation - to treat periodic breathing and central sleep apnea (SA) (the goal of this project is to investigate whether stimulation with DC current can be used to modulate carotid receptors in animal models)  
 P.I. – Thomas Robert (Beth Israel Deaconess Medical Center) / Role – Co-investigator
  
4. American Heart Association (Scientist Development Grant) 7/1/2007 – 6/30/2010  
 Project: Effects of transcranial DC stimulation coupled with constraint-induced therapy on motor function in stroke patients (the goal of this project is to investigate whether cortical DC stimulation coupled with a technique of physical therapy (constraint induced therapy) improves motor function in chronic stroke patients)  
 P.I. – Felipe Fregni (Beth Israel Deaconess Medical Center)
  
5. Aspect Medical Systems (Private Company Grant) 2/1/2008 – 1/31/2009  
 Project: Effects of electrical stimulation of the nervous system on EEG activity in healthy subjects – comparison of different techniques of noninvasive brain stimulation using EEG as a surrogate of brain activity changes  
 P.I. – Felipe Fregni

### Completed Research Support

1. National Pancreas Foundation (P.I. – Felipe Fregni) 6/1/2006-5/31/2007  
 Project - The effect of a 10-day treatment with TMS on abdominal pain in patients with locally advanced and advanced pancreatic cancer, a randomized Phase II study (the goal of this study was to collect preliminary data on the therapeutic effects of rTMS on visceral chronic pain due to pancreatic cancer).