



## Ignacio Saez, Ph.D.

### Research/Academic Interests

Dr. Saez studies the neurophysiological basis of human cognition - how electrical activity generated in the brain underlies human thoughts and actions. To do this, he leverages interventions that require the implantation of electrodes in the brain of neurosurgical patients, such as electrocorticography (ECoG) or stereotactic EEG (sEEG) in epilepsy patients. These interventions provide direct access to electrical brain activity with high spatial and temporal resolution. Patients complete cognitive tasks, which allows assessing the relationship between complex spatiotemporal brain activity patterns and behavior.

A major focus of the lab is the study of decision-making - how we make choices and learn from their outcomes. Often this is done through the use of computational models, which provide mathematical depictions of different aspects of choice behavior which are otherwise hard to capture (i.e. regret). From this basis, Dr. Saez explores the intersection of decision-making with other aspects of cognition (social behavior, learning and memory, etc) as well as the implications for pathologies in which decision-making is damaged, such as addiction or obsessive-compulsive disorder, with the long-term goal of designing biologically-informed neuromodulatory therepeutical strategies.

**Title** Assistant Professor

**Department** [Neurological Surgery](#)

**Center/Program Affiliation** [Center for Neuroscience](#)

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**Education** Ph.D., Neuroscience, Baylor College of Medicine, Texas, 2009  
B.Sc., Clinical and Molecular Biology, University of Navarre, Spain, 2002  
B.Sc., Biochemistry and Genetics, University of Navarre, Spain, 2001

**Honors and Awards** K01 Career Development Award, National Institute of Mental Health, NIH, 2016-2020  
Deans Office Award, Haas School of Business, UC Berkeley, 2013-2015  
NIDA Travel Award, 2011  
La Caixa fellowship for postgraduate studies, Spain, 2003-2005  
Erasmus scholarship for study abroad, European Commission, 2000-2001

**Select Recent Publications** Encoding of multiple reward-related factors in transient and sustained high-frequency activity in human OFC. Ignacio Saez, Jack Lin, Arjen Stolk, Edward F. Chang, Josef Parvizi, Gerwin Schalk, Robert T. Knight and Ming Hsu. *Current Biology*, Sep 2018



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Integrated analysis of anatomical and electrophysiological human intracranial data. Arjen Stolk, Sandon M. Griffin, Roemer van der Meij, Callum Dewar, Ignacio Saez, Jack J. Lin, Giovanni Piantoni, Jan-Mathijs Schoffelen, Robert T. Knight, Robert Oostenveld.. Nature Protocols, Jul 2018.

Sub-second dopamine fluctuations in human striatum encode superposed error signals about actual and counterfactual reward. Kenneth T. Kishida, Ignacio Saez, Terry Lohrenz, Mark R. Witcher, Adrian W. Laxton, Stephen B. Tatter, Jason P. White, Thomas L. Ellis, Paul E. M. Phillips, P. Read Montague. Proceedings of the National Academy of Sciences, Jan 2016.

Dopamine Modulates Egalitarian Behavior In Humans. Ignacio Saez, Lusha Zhu, Eric Set, Andrew Kayser and Ming Hsu. Current Biology, Mar 2015.

From genes to behavior: placing cognitive models in the context of biological pathways. Ignacio Saez, Eric Set and Ming Hsu. Frontiers in Neuroscience, Nov 2014.

Dissociable contribution of prefrontal and striatal dopaminergic genes to learning in economic games. Eric Set, Ignacio Saez, Lusha Zhu, Daniel Houser, Noah Myung, Songfa Zhong, Richard Ebstein, Soo-Hong Chew and Ming Hsu. Proceedings of the National Academy of Sciences, Jul 2014.

Sub-second dopamine detection in human striatum. Kenneth T. Kishida, Stefan Sandberg, Terry Lohrenz, Youssef G. Comair, Ignacio Saez, Paul E.M. Phillips and P. Read Montague. PLoS ONE, Aug 2011.

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