RAYMUNDO BÁEZ-MENDOZA, PH.D.

Group Leader. Neurobiology Department

German Primate Center and Leibniz Center for Primate Research

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Social neurophysiology: My main goal is to study the neuronal circuits of normal and abnormal social behavior using neurophysiology and neuronal manipulations in interacting humans and animals.

PROFESSIONAL APPOINTMENTS

2022 – Present	Group Leader. Neurobiology Department. German Primate Center and Leibniz Center for Primate Research
2018 – 2022	Instructor in Research. Department of Neurosurgery, Harvard Medical School and Massachusetts General Hospital. This is a non-tenure track faculty position with the responsibility of performing research and mentoring students.
2015 – 2018	Research Fellow. Department of Neurosurgery, Harvard Medical School and Massachusetts General Hospital.
2014 – 2015	Research Associate. Department of Physiology, Development and Neuroscience. University of Cambridge.

EDUCATION

2014 **Ph.D. in Neuroscience (University of Cambridge, UK)**

Dissertation title: “Neuronal reward signals during social interactions” supervised by Prof. Wolfram Schultz

Much is known about reward signals while individuals are in isolation. However, during social interactions, there are many more reward signals relevant to decision making and ultimately individual and group fitness. I created a single-cell neurophysiology setup to study the individual brain of macaques during social interactions. The neurophysiology focused on the striatum, but I have also explored other basal ganglia regions. I found that the striatum contains signals related to the agent of reward and inequity.

2007 **M.Sc. in Behavioural and Neural Sciences (University of Tuebingen, Germany)**

Dissertation title: “Neural coding of individuals in the macaque temporal cortex” supervised by Dr. Kari Hoffman. GPA: 1.0 (equivalent to 4.0)

For my master’s thesis I investigated the neural basis for the amodal representation of the individual. I presented dynamic stimuli containing the faces, body parts, and vocalizations of both familiar and unfamiliar monkeys to a rhesus implanted while recording neurophysiological activity in the right temporal lobe. At a population level, we found preliminary evidence of neural coding of individuals independent of the stimulus modality in the macaque temporal lobe.

2004 **B.Sc. in Psychology (Universidad Nacional Autónoma de México, Mexico)**

Thesis title: “Kainic acid modifies burying behavior in rats” supervised by Dr. Luisa Rocha. Graduated with Honors. GPA: 9.4 (equivalent to 4.0)

Areas of specialization: Experimental psychology and physiological psychology

PEER-REVIEWED PUBLICATIONS

2022 S. W. Li, O. Zeliger, L. Strahs, **R. Báez-Mendoza**, L. M. Johnson, A. McDonald Wojciechowski, Z. M. Williams. *A prefrontal mechanism linking social group dominance with competitive success.* Nature 2022 Mar 16. doi: 10.1038/s41586-021-04000-5. Online ahead of print.

Contributions: Experimental design, Data analyses

2021 S. W. Li, Z. M. Williams, **R. Báez-Mendoza.** *Investigating the neurobiology of abnormal social behaviors*. Frontiers in Neural Circuits. doi: 10.3389/fncir.2021.769314

Contributions: Conceptualization, Edited manuscript.

2021 **R. Báez-Mendoza***, E. P. Mastrobattista, A. J. Wang, Z M. Williams. *Social Agent Identity Cells in the Prefrontal Cortex of Interacting Groups of Primates* Science. 274, 6566, eabb4149. doi:10.1126/science.abb4149

Contributions: Conceptualization, Data acquisition, Data analyses, Designed apparatus, Drafted manuscript. *Corresponding author.

Highlighted on: EurekAlert!, Bild der Wissenschaft (Germany), Agencia SINC (Spain), O Globo (Brazil), Aeon

2021 **R. Báez-Mendoza*,** Y. Vázquez*, E. Mastrobattista, Z. M. Williams. *Neuronal circuits for social decision-making and their clinical implications* Frontiers in Neuroscience. 15(1291) doi:10.3389/fnins.2021.720294

Contributions: Conceptualization, Drafted manuscript. *co-first and co-corresponding authors.

2021 M. Jamali, B. L. Grannan, E. Fedorenko, R. Saxe, **R. Báez-Mendoza**, Z. M. Williams. *Single-neuronal predictions of others' beliefs in humans.* Nature. 591, 610-614.10.1038/s41586-021-03184-0

Contributions: Conceptualization, Data acquisition, Data analyses, Edited manuscript

Highlighted on: F1000, Nature Podcast, Spectrum News, Harvard Gazette

2021 S Ferrari-Toniolo, PM Bujold, F Grabenhorst, **R Báez-Mendoza**, W Schultz *Nonhuman Primates Satisfy Utility Maximization in Compliance with the Continuity Axiom of Expected Utility Theory*. Journal of Neuroscience. 41 (13), 2964-2979. 10.1523/JNEUROSCI.0955-20.2020

Contributions: Data acquisition, Experimental design

2019 F Grabenhorst, **R Báez-Mendoza**, W Genest, G Deco, W Schultz. *Primate amygdala neurons simulate decision processes of social partners*. Cell. 177: 1-13. 10.1016/j.cell.2019.02.042

Contributions: Conceptualization, Data acquisition, Data analyses, Edited manuscript

Highlighted on: Haaretz (Israel), le Scienze (Italy), Nature Reviews Neuroscience

2016 **R. Báez-Mendoza** and W. Schultz. *Performance error-related activity in monkey striatum during social interactions.* Sci. Rep. 37199. 10.1038/srep37199

Contributions: Conceptualization, Data acquisition, Data analyses, Drafted manuscript. *Corresponding author.

2016 **R. Báez-Mendoza**, C.R. van Coeverden and W. Schultz. *A neuronal reward inequity signal in primate striatum.* J. Neurophysiol. 115: 68-79. 10.1152/jn.00321.2015

Contributions: Conceptualization, Data acquisition, Data analyses, Drafted manuscript. *Corresponding author.

2013 **R. Báez-Mendoza** and W. Schultz. *The role of the striatum in social behaviour*. Front. Neurosci. 7:233. doi: 10.3389/fnins.2013.00233

Contributions: Conceptualization, Drafted manuscript. *Corresponding author.

2013 **R. Báez-Mendoza**, C. Harris and W. Schultz. *Activity of striatal neurons reflects social action and own reward*. Proc. Natl. Acad. Sci. USA. 110:41, 16634:16639

Contributions: Conceptualization, Data acquisition, Data analyses, Designed apparatus, Drafted manuscript. *Corresponding author.

MANUSCRIPTS UNDER REVISION

1. **R. Báez-Mendoza**, F. Bounni, B. Sanders, W.S. Li, Z. M. Williams. *Neuronal substrates of group decisions and social bias in mice.*

Contributions: Conceptualization, Data analyses, Drafted manuscript

NON-PEER REVIEWED PUBLICATIONS

2022 **R. Báez-Mendoza,** Z.M. Williams. *A stare like yours: Naturalistic social gaze interactions reveal robust neuronal representations.* Neuron 110 (13), 2048-2049 https://doi.org/10.1016/j.neuron.2022.06.007

Contributions: Conceptualization, Drafted manuscript

2020 **R. Báez-Mendoza**, Z. M. Williams. *Monkeys Show Theory of Mind.* Cell Reports 30 (13), 4319-4320

Contributions: Conceptualization, Drafted manuscript

2009 **R. Báez-Mendoza**, K. L. Hoffman. *Object ontology in the temporal lobe* in *Cortical Mechanisms of Vision*, ed. Michael Jenkin and Laurence Harris. Cambridge University Press

Contributions: Data acquisition, Data analyses, Drafted manuscript.

GRANTS, AWARDS & HONORS

2022 – 2027	European Research Council, Starting Grant	€ 1,700,000
	NEUROGROUP: “Neuronal basis of group cooperation and social ties in monkeys and humans”	
2021 – 2022	Leadership in Research Course, MGH	
2017 – 2019	NARSAD Young Investigator award	$70,000
	“Single-neuronal substrates of interactive social behavior in primates”	
2016	Fund for Medical Discovery fellowship. MGH-ECOR	$65,000
	“Studying higher cognitive processing in the human prefrontal cortex at the single-neuron level”	

2016 – 2021 Member of the national researcher system of Mexico

2014 Cambridge Philosophical Society Travel Grant

2011 Grindley Grant, Experimental Psychology Society

2011 Avrith Travel Grant, University of Cambridge

2004 – 2006 International Max Planck Graduate School Scholarship

2003 – 2004 Fundación Miguel Alemán, Bachelor studies scholarship

PENDING SUPPORT

INVITED PRESENTATIONS

2021 Mini-symposium, Society for Neuroscience, Chicago, USA

2021 Social Neuroscience Lunch Seminars, Dartmouth College, Hannover, USA

2021 Mt. Sinai Neuroscience Seminars, Icahn School of Medicine at Mount Sinai, New York City, USA

2021 Dept. of Physiology, University of California San Francisco, San Francisco, USA

2021 Princeton Institute of Neuroscience, Princeton, USA

2021 Department of Neurology, Massachusetts General Hospital, Boston, USA

2020 Brandeis University, Waltham MA, USA (Postponed due to COVID-19)

2020 Hertie Institute for Clinical Neuroscience, Tuebingen, Germany

2019 Society for Social Neuroscience, Chicago, USA

2019 Primate Neurobiology Meeting, Goettingen, Germany

2018 Society for Social Neuroscience, San Diego, USA

2018 Department of Cognitive Processes, Max Planck Institute for Biological Cybernetics, Tuebingen, Germany

CONFERENCE PRESENTATIONS

2019 **R. Báez-Mendoza**, E. P. Mastrobattista, A. J. Wang, Z. M. Williams. Prefrontal mechanisms for tracking group behavior, reputation, and identity during three-agent interaction in macaques. Society for Neuroscience. Chicago, USA

2019 F. Grabenhorst, **R. Báez-Mendoza**, W. Genest, G. Deco, W. Schultz. Neurons in the primate amygdala simulate decision processes of social partners. Society for Neuroscience. Chicago, USA

2019 M. Jamali, B. L. Grannan, **R. Báez-Mendoza**, Z. Williams. Cellular representations of human theory of mind. Society for Neuroscience. Chicago, USA

2018 **R. Báez-Mendoza**, E. P. Mastrobattista, A. J. Wang, K. Hu, Z. M. Williams Single-neuronal correlates of group behavior and reciprocity in three interacting macaques. Society for Neuroscience. San Diego, USA

2018 M. Jamali, B. L. Grannan, **R. Báez-Mendoza**, Z. Williams. Constructing single-neuronal representations of another's beliefs in the human prefrontal cortex. Society for Neuroscience. San Diego, USA

2017 **R. Báez-Mendoza**, F. Bounni, Z. Williams. Neuronal substrates of group decisions and social bias in mice. Society for Neuroscience. Washington DC, USA.

2017 F. Grabenhorst, **R. Báez-Mendoza**, W. Genest, W. Schultz. Primate amygdala neurons simulate decision processes of social partners. Society for Neuroscience. Washington, DC, USA.

AD-HOC REVIEWER

Science; Cell Reports; Current Biology; eLife; Nature Communications; Neuron; Frontiers in Neuroscience; Games and Economic Behaviour; Neuropsychopharmacology; Neuroscience and Biobehavioral Reviews; Philosophical Transactions of the Royal Society B-Biological Sciences; PLOS one; SACNAS conference; Scientific Reports; Social, Cognitive and Affective Neuroscience

MENTORING EXPERIENCE

2020, 2022- Halle Hangen
Now: **Research Technician, German Primate Center**
Career Stage: Undergraduate student, University of Rochester
Mentoring Role: Direct research supervisor and mentor

2020 Toby Kaufman
Career Stage: Undergraduate Student, Northeastern University
Mentoring Role: Direct research supervisor and mentor

2019 Benjamin Sanders, BS.
Now: **Graduate student, Yale University**
Career Stage: undergraduate student, Northeastern University
Mentoring Role: Research supervisor and mentor
Accomplishments: co-authored 1 manuscript

2017-2018 Amy J. Wang, MD.
Now: **Neurosurgery Resident, Massachusetts General Hospital**
Career Stage: Medical Student, Harvard Medical School
Mentoring Role: **MD thesis supervision**
Accomplishments: HHMI Medical Research Fellowship, Top Abstract AANS, co-authored 1+ manuscripts

2017 Jake Grondin, BS
Now: **Medicine student, Virginia Tech Carillion**
Career Stage: Undergraduate student, Northeastern University
Mentoring role: Direct research supervisor

2016-2020 Emma Mastrobattista, BS.
Now: **Medicine student, U Connecticut**
Career Stage: Undergraduate student. Northeastern University
Mentoring Role: Direct research supervisor and mentor
Accomplishments: Top poster award Neuro-Boston conference, co-authored 3+ manuscripts

2016-2022 William Li, BS.
Career Stage: MD/PhD student, Boston University
Mentoring Role: Research supervisor and advisor
Accomplishments: co-authored 3+ manuscripts

2015-2017 Kejia Hu, MD.
Now: **Neurosurgery Resident, Fudan University, China**
Career Stage: MD Student.
Mentoring Role: Research supervisor and advisor

2012-2015 Charlotte van Coeverden, PhD
Now: **Data Manager at University of Cambridge, Department of Public Health and Primary Care, UK**
Career Stage: PhD Student, University of Cambridge
Mentoring Role: Direct research supervisor
Accomplishments: co-authored 1 manuscript

TEACHING EXPERIENCE

2014 **Supervisor in Neurobiology 1B (Emmanuel College & Jesus College)**

University of Cambridge, Department of Physiology, Development and Neuroscience.

In the collegiate system of the University of Cambridge, colleges are in charge or organizing tutoring for undergraduate members of its college for every subject. The neurobiology course covers topics ranging from action potential generation to language and visual attention. I supervised a small group of students that met on a weekly basis. During these supervisions I gave the students feedback on their essays, we revised and debated the topics they had covered in the week and set homework.

2013-2015 **Demonstrator in eye movements practical**

University of Cambridge, Department of Physiology, Development and Neuroscience

2009 **Demonstrator in Neurobiology 1B practicals**

University of Cambridge, Department of Physiology, Development and Neuroscience

MEMBERSHIPS

Society for Social Neuroscience; Society for Neuroscience;

PROFESSIONAL SERVICE

2021 **Society for Neuroscience**

Co-chair Symposium on 'Neurophysiology of social behaviors: from information gathering to interaction' (Postponed from SfN 2020)

2018 **Society for Social Neuroscience meeting**

Co-chaired Symposium on “Neuronal substrates of interactive social behavior”

PUBLIC ENGAGEMENT IN SCIENCE

2018 - 2020 MGH-Timilty Middle School Science Fair Program. Mentor for middle school students from underprivileged backgrounds preparing science fair projects (program suspended due to COVID-19)

2018 - 2020 MGH Youth Scholars Program. Host for high school students from underprivileged backgrounds visiting the hospital to learn about careers in STEM (program suspended due to COVID-19)

2014	Centenary of the Physiological Laboratory, University of Cambridge, Department of Physiology, Development and Neuroscience. Explained Lord Adrian's extracellular recording techniques and demonstrated extracellular recording with modern techniques.
2008-2010	Science on Saturday, University of Cambridge, Department of Physiology, Development and Neuroscience.