

# CURRICULUM VITAE

## Hernan Gonzalo Rey PhD

**Assistant Professor  
Department of Neurosurgery  
Division of Research**

### OFFICE ADDRESS:

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### EDUCATION:

03/01/1997 - 11/15/2002 Electronics Engineering, University of Buenos Aires, Buenos Aires, Argentina  
03/01/2004 - 03/30/2009 Doctor in Engineering, University of Buenos Aires, Buenos Aires, Argentina

### POSTGRADUATE TRAINING AND FELLOWSHIP APPOINTMENTS:

04/01/2004 - 03/30/2009 Doctoral Fellowship, CONICET (National Scientific and Technical Research Council), Buenos Aires (Argentina)

### FACULTY APPOINTMENTS:

10/01/2015 - 12/01/2019 Lecturer, Neuroscience, Psychology and Behaviour, University of Leicester, Leicester, United Kingdom  
10/08/2020 - 06/08/2022 Assistant Professor, Neurosurgery, Baylor College of Medicine, Houston, TX  
07/01/2022 - Present Assistant Professor, Neurosurgery, Medical College of Wisconsin, Milwaukee, WI

### EDUCATIONAL ADMINISTRATIVE APPOINTMENTS:

2018 Developer and Director of the MSc Programme in Computational and Systems Neuroscience, Neuroscience, Psychology and Behaviour, University of Leicester, Leicester, United Kingdom

### HOSPITAL STAFF PRIVILEGES:

01/01/2011 - 12/31/2018 Clinical Research Fellow, Clinical Neurosciences, King's College Hospital Foundation Trust, London, United Kingdom  
11/01/2020 - 06/08/2022 Researcher, Neurosurgery, Baylor St. Luke's Medical Center, Houston, TX  
07/01/2022 - Present Staff, Neurosurgery, Froedtert Hospital, Milwaukee, WI  
12/01/2022 - Present Staff, Neurosurgery, Children's Wisconsin, Milwaukee, WI

### AWARDS AND HONORS:

09/15/2001 - 09/15/2002 Undergraduate Student Fellowship, University of Buenos Aires  
2005 Fellowship to attend the Complex Systems in Brain Dynamics Summer School (Potsdam, Germany), Helmholtz Institute  
2008 Fellowship to attend the Theoretical Neuroscience and Complex Systems Summer School (Frankfurt, Germany), Programme for European Neuroscience Schools (PENS)  
03/01/2012 - 10/30/2015 Special Training Fellowship in Biomedical Informatics, Medical Research Council (United Kingdom)  
2014 Rising Star Award, Engineering and Physical Sciences Research Council (United Kingdom)

### MEMBERSHIPS IN HONORARY AND PROFESSIONAL SOCIETIES:

2020 - Present Congress of Neurological Surgeons  
2020 - Present Society for Neuroscience

## RESEARCH GRANTS/AWARDS/CONTRACTS/PROJECTS:

### Active

#### Peer Review

Title: Recording neural activity 24/7 at different scales in the human brain: a unique opportunity to improve epilepsy diagnosis and treatment

Source: CTSI

Role & Effort: PI

PI: Hernan Rey

Dates: 05/01/2023 - 04/30/2024

Direct Funds: \$49,954

### Prior

#### Peer Review

Title: MRC Proximity to Discovery (P2D): Industry Engagement Fund

Source: Medical Research Council (United Kingdom)

Role & Effort: Investigator

PI: Rodrigo Quian Quiroga

Dates: 01/01/2017 - 12/31/2017

Title: International Exchanges Cost Share award for overseas travel between collaborators

Source: Royal Society (United Kingdom)

Role & Effort: Investigator

PI: Rodrigo Quian Quiroga

Dates: 01/01/2018 - 12/31/2018

Title: MRC Confidence in Concept scheme

Source: Medical Research Council (United Kingdom)

PI: Hernan G Rey

Dates: 12/01/2018 - 11/30/2019

## INVITED LECTURES/WORKSHOPS/PRESENTATIONS:

### International

Computational Neuroscience and Neuroinformatics Workshop, Edinburgh, United Kingdom, 2014

Brain Institute Seminar, Natal, Brazil, 2014

– LASCON V. Latin American School on Computational Neuroscience, Tibau do Sul, Brazil, 2014

Center for Neuroscience and Cognitive Systems Seminar, Rovereto, Italy, 2014

Cognitive and Clinical Neurophysiology Workgroup Seminar, Bonn, Germany, 2015

Blackrock booth presentation, Society for Neuroscience Annual Meeting, San Diego, CA, 2016

Lates at the Science Museum, London, United Kingdom, 2016

Consciousness Club, Tokyo, Japan, 2017

Kalivas Lab Seminar, Charleston, SC, 2018

Spike Sorting and Reproducibility for Next Generation Electrophysiology Workshop, Edinburgh, United Kingdom, 2019

## EXTRAMURAL TEACHING:

### Medical Student Education

1998 - 2006 University of Buenos Aires, Teaching Assistant (course on Probability Theory)  
2002 - 2005 University of Buenos Aires, Teaching Assistant (course on Signal Processing)  
2006 - 2010 University of Buenos Aires, Lecturer (course on Probability and Statistics)

### **Graduate Student Education**

2004 - 2010 University of Buenos Aires, Special Lectures in the courses on Neural Networks and Biological Systems  
2018 University of Leicester, Lecturer in the seminar "Advanced methods for the analysis of intraoperative single neuron recordings in humans".

## **BIBLIOGRAPHY**

### **Refereed Journal Publications/Original Papers**

1. Rey Vega L, Tressens S, Rey H. Set Theoretic adaptive filtering: Using periodogram and projections onto convex sets 13th European Signal Processing Conference, EUSIPCO 2005. 2005:736-739.
2. Vega LR, Tressens S, Rey H. Adaptive filtering using projection onto convex sets Latin American Applied Research. April 2006;36(2):123-127.
3. Rey H, Vega LR, Tressens S, Benesty J. Optimum variable explicit regularized affine projection algorithm ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings. 2006;3.
4. Benesty J, Rey H, Vega LR, Tressens S. A nonparametric VSS NLMS algorithm IEEE Signal Processing Letters. October 2006;13(10):581-584.
5. Rey H, Vega LR, Tressens S, Benesty J. Variable explicit regularization in affine projection algorithm: Robustness issues and optimal choice IEEE Transactions on Signal Processing. May 2007;55(5 II):2096-2109.
6. Vega LR, Rey H, Benesty J, Tressens S. A robust adaptive filtering algorithm against impulsive noise ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings. 2007;3.
7. Vega LR, Rey H, Benesty J, Tressens S. A stochastic model for a new robust NLMS algorithm European Signal Processing Conference. 2007:375-379.
8. Lew SE, Rey HG, Gutnisky DA, Zanutto BS. Differences in prefrontal and motor structures learning dynamics depend on task complexity: A neural network model Neurocomputing. August 2008;71(13-15):2782-2793.
9. Vega LR, Rey H, Benesty J, Tressens S. A new robust variable step-size NLMS algorithm IEEE Transactions on Signal Processing. 2008;56(5):1878-1893.
10. Rey Vega L, Rey H, Benesty J, Tressens S. A fast robust recursive least-squares algorithm IEEE Transactions on Signal Processing. 2009;57(3):1209-1216.
11. Vega LR, Rey H, Benesty J, Tressens S. A family of robust algorithms exploiting sparsity in adaptive filters IEEE Transactions on Audio, Speech and Language Processing. May 2009;17(4):572-581.
12. Rey H, Rey Vega L, Benesty J, Tressens S. Author's reply to "comments on 'variable explicit regularization in affine projection algorithm: Robustness issues and optimal choice'" IEEE Transactions on Signal Processing. July 2010;58(7):3953-3954.
13. Rey Vega L, Rey H, Benesty J. A robust variable step-size affine projection algorithm Signal Processing. September 2010;90(9):2806-2810.
14. Rey HG, Gutnisky D, Zanutto B. A biologically plausible model for same/different discrimination. Annu Int Conf IEEE Eng Med Biol Soc. 2010;2010:4156-9.
15. Rey Vega L, Rey H, Benesty J. Stability analysis of adaptive filters with regression vector nonlinearities Signal Processing. August 2011;91(8):2091-2100.
16. Lew S, Rey HG, Zanutto BS. Neuronal mechanisms underlying exploration-exploitation strategies in operant learning Proceedings of the International Joint Conference on Neural Networks. 2013.
17. Rey HG, Fried I, Quian Quiroga R. Timing of single-neuron and local field potential responses in the human medial temporal lobe. Curr Biol. 2014 Feb 03;24(3):299-304. PMID: PMC3963414
18. Rey HG, Ison MJ, Pedreira C, Valentin A, Alarcon G, Selway R, Richardson MP, Quian Quiroga R. Single-cell recordings in the human medial temporal lobe. J Anat. 2015 Oct;227(4):394-408. PMID: PMC4580099
19. Navajas J, Rey HG, Quian Quiroga R. Perceptual and contextual awareness: methodological considerations

- in the search for the neural correlates of consciousness. *Front Psychol.* 2014;5:959. PMID: PMC4148639
20. Rey HG, Ahmadi M, Quian Quiroga R. Single trial analysis of field potentials in perception, learning and memory. *Curr Opin Neurobiol.* 2015 Apr;31:148-55.
  21. Rey HG, Pedreira C, Quian Quiroga R. Past, present and future of spike sorting techniques. *Brain Res Bull.* 2015 Oct;119(Pt B):106-17. PMID: PMC4674014
  22. McClelland VM, Valentin A, Rey HG, Lumsden DE, Elze MC, Selway R, Alarcon G, Lin JP. Differences in globus pallidus neuronal firing rates and patterns relate to different disease biology in children with dystonia. *J Neurol Neurosurg Psychiatry.* 2016 Sep;87(9):958-67. PMID: PMC5013118
  23. Caffaratti H, Navajas J, Rey HG, Quian Quiroga R. Where is the ball? Behavioral and neural responses elicited by a magic trick. *Psychophysiology.* 2016 Sep;53(9):1441-8.
  24. Chaure FJ, Quian QR, Kochen SS, Rey HG. A novel unsupervised spike sorting implementation with variable number of features 2017 17th Workshop on Information Processing and Control, RPIC 2017. 14 December 2017;2017-January:1-6.
  25. Lopes-Dos-Santos V, Rey HG, Navajas J, Quian Quiroga R. Extracting information from the shape and spatial distribution of evoked potentials. *J Neurosci Methods.* 2018 Feb 15;296:12-22. PMID: PMC5840508
  26. Chaure FJ, Rey HG, Quian Quiroga R. A novel and fully automatic spike-sorting implementation with variable number of features. *J Neurophysiol.* 2018 Oct 01;120(4):1859-1871. PMID: PMC6230803
  27. Rey HG, De Falco E, Ison MJ, Valentin A, Alarcon G, Selway R, Richardson MP, Quian Quiroga R. Encoding of long-term associations through neural unitization in the human medial temporal lobe. *Nat Commun.* 2018 Oct 22;9(1):4372. PMID: PMC6197188
  28. Rey HG, Gori B, Chaure FJ, Collavini S, Blenkmann AO, Seoane P, Seoane E, Kochen S, Quian Quiroga R. Single Neuron Coding of Identity in the Human Hippocampal Formation. *Curr Biol.* 2020 Mar 23;30(6):1152-1159.e3. PMID: PMC7103760
  29. Aponik-Gremillion L, Chen YY, Bartoli E, Koslov SR, Rey HG, Weiner KS, Yoshor D, Hayden BY, Sheth SA, Foster BL. Distinct population and single-neuron selectivity for executive and episodic processing in human dorsal posterior cingulate. *Elife.* 2022 Sep 28;11. PMID: PMC9519147

### **Books, Chapters, and Reviews**

1. Rey HG, Lew SE, Zanutto BS. Dopamine and norepinephrine modulation of cortical and subcortical dynamics during visuomotor learning *Monoaminergic Modulation of Cortical Excitability.* 2007:247-260.
2. Rey Vega L. and Rey H.G.. *A Rapid Introduction to Adaptive Filtering* Springer. 2013
3. Quian Quiroga R, Boscaglia M, Jonas J, Rey HG, Yan X, Maillard L, Colnat-Coulbois S, Koessler L, Rossion B. Single neuron responses underlying face recognition in the human midfusiform face-selective cortex. *Nat Commun.* 2023 Sep 13;14(1):5661. PMID: PMC10499913
4. Myers J, Xiao J, Mathura R, Shofty B, Pirtle V, Adkinson J, Allawala AB, Anand A, Gadot R, Najera R, Rey HG, Mathew SJ, Bijanki K, Banks G, Watrous A, Bartoli E, Heilbronner SR, Provenza N, Goodman WK, Pouratian N, Hayden BY, Sheth SA. Intracranial Directed Connectivity Links Subregions of the Prefrontal Cortex to Major Depression. *medRxiv.* 2024 Aug 08. PMID: PMC11326344