ALEXANDRE SAYAL

Biomedical engineer searching for the links between Neuroscience, Informatics and Music.

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R^G ORCiD 🐦

EDUCATION

PhD candidate   University of Coimbra, Biomedical Engineering   2019 - present

MSc   University of Coimbra, Biomedical Engineering   September 2016
Field: Clinical Informatics and Bioinformatics
Thesis: "Brain Connectivity Analysis for real-time fMRI Neurofeedback Experiments"
Advisors: Miguel Castelo-Branco, Bruno Direito

RESEARCH EXPERIENCE

Coimbra Institute for Biomedical Imaging and Translational Research (CIBIT)   2018 - present
Coimbra, Portugal
Research Fellow
- Studying the neural mechanisms of visual motion perception.
- MRI multiband EPI sequence optimization.
- Exploration of fMRI connectivity methods.

Institute for Nuclear Science Applied to Health (ICNAS)   2016 - 2018
Coimbra, Portugal
Research Fellow
- Unraveling mechanisms of bistable human visual perception.
- fMRI experimental design planning and data analysis automation.

Institute for Biomedical Imaging and Life Sciences (IBILI)   2015
Coimbra, Portugal
Intern
- Basics of fMRI data analysis: from raw scanner data to interpretable activation maps.
- Basics of fMRI connectivity analysis.

Current research focuses on the neural mechanisms behind human visual perception, as measured by functional magnetic resonance imaging (fMRI), allied to the application and validation of connectivity methods, implementation of neurofeedback experiments, and optimization of MRI sequences for higher temporal resolution fMRI data.

JOURNAL PUBLICATIONS

- Direito, B., Ramos, M., Pereira, J., Sayal, A., Sousa, T., Castelo-Branco, M. (2021). *"Directly Exploring the Neural Correlates of Feedback-Related Reward Saliency and Valence During Real-Time fMRI-Based Neurofeedback"*. Frontiers in Human Neuroscience 14. doi: 10.3389/fnhum.2020.578119.
- Direito, B., Mouga, S., Sayal, A., Simões, M., Quental, H., Bernardino, I., Playle, R., McNamara, R., Linden, D.E.J., Oliveira, G., Castelo-Branco, M. (2021). *"Training the social brain: Clinical and neural effects of an 8-week real-time functional magnetic resonance imaging neurofeedback Phase IIa Clinical Trial in Autism"*. Autism 25. doi: 10.1177/13623613211002052.
- Sayal, A., Sousa, T., Duarte, J.V., Costa, G.N., Martins, R., Castelo-Branco, M. (2020). *"Identification of Competing Neural Mechanisms Underlying Positive and Negative Perceptual Hysteresis in the Human Visual System"*. NeuroImage 221. doi:10.1016/j.neuroimage.2020.117153.
- Travassos, C., Sayal, A., Direito, B., Castelhano, J., Castelo-Branco, M. (2020). *"Volitional Modulation of the Left DLPFC Neural Activity Based on a Pain Empathy Paradigm - A Potential Novel Therapeutic Target for Pain"*. Frontiers in Neurology 11. doi:10.3389/fneur.2020.00714.
- Simões, M., Abreu, R., Direito, B., Sayal, A., Castelhano, J., Carvalho, P., Castelo-Brancom M. (2020). *"How Much of the BOLD-FMRI Signal Can Be Approximated from Simultaneous EEG Data: Relevance for the Transfer and Dissemination of Neurofeedback Interventions"*. Journal of Neural Engineering 17. doi:10.1088/1741-2552/ab9a98.
- Fernandes, T.T., Direito, B., Sayal, A., Pereira, J., Andrade, A., Castelo-Branco, M. (2020). *"The Boundaries of State-Space Granger Causality Analysis Applied to BOLD Simulated Data: A Comparative Modelling and Simulation Approach"*. Journal of Neuroscience Methods 341. doi: 10.1016/j.jneumeth.2020.108758.
- Pereira, J., Direito, B., Sayal, A., Ferreira, C., Castelo-Branco, M. (2019). *"Self-Modulation of Premotor Cortex Interhemispheric Connectivity in a Real-Time Functional Magnetic Resonance Imaging Neurofeedback Study Using an Adaptive Approach"*. Brain Connectivity 9. doi:10.1089/brain.2019.0697.
- Direito, B., Lima, J., Simões, M., Sayal, A., Sousa, T., Luhrs, M., Ferreira, C., Castelo-Branco, M. (2019). *"Targeting dynamic facial processing mechanisms in superior temporal sulcus using a novel fMRI neurofeedback target"*. Neuroscience 406. doi:10.1016/j.neuroscience.2019.02.024.
- Sousa, T., Sayal, A., Duarte, J.V., Costa, G.N., Martins, R., Castelo-Branco, M. (2018). *"Evidence for distinct levels of neural adaptation to both coherent and incoherently moving visual surfaces in visual area hMT+"*. NeuroImage 179. doi:10.1016/j.neuroimage.2018.06.075.

PRESENTATIONS

Oral Presentation, *"Study of motion adaptation and its role in deciding between competing surface representations"*, 7th Iberian Congress on Perception, Coimbra, Portugal, July 2017.

Poster Presentation, *"Unraveling the neural correlates of perceptual hysteresis: the effects of perceptual history on the visual perception of an ambiguous stimulus"*, 11th FENS Forum of Neuroscience, Berlin, Germany, July 2018.

Poster Presentation, *"Studying the effects of perceptual history on deciding between percepts of ambiguous moving plaids"*, Salzburg Mind-Brain Annual Meeting (SAMBA), Salzburg, Austria, July 2018.

Poster Presentation, *"(Des)inhibition, the side-effect of adaptation in bistable perception"*, 2019 OHBM Annual Meeting, Rome, Italy, June 2019.

Poster Presentation and Award, *"Directly exploring the neural correlates of feedback-related reward saliency during fMRI-based Neurofeedback"*, rt-FIN2019, Maastricht, The Netherlands, December 2019.

PROFESSIONAL TRAINING

Workshops
- *Brain Imaging: an introductory workshop on research and clinical applications.* Mind-Brain College, University of Lisbon. June 2016.
- *8th Workshop on Biomedical Engineering.* Faculty of Sciences, University of Lisbon. April 2016.

Symposiums
- *Behind and Beyond the Brain.* 12th Bial Foundation Symposium, Porto. April 2018.

Courses
- *Good Clinical Practice* - NIDA Clinical Trials (May 2019)
- *Basics of MRI Safety* - Siemens Healthineers (September 2020)

INTERNATIONAL COLLABORATIONS

Project Braintrain: Methods of real-time fMRI neurofeedback for clinical use (http://www.braintrainproject.eu/).
- Collaboration in "*A neurofeedback strategy for the improvement of facial expression recognition/perception in ASD*".

Project STIPED: Non-invasive brain stimulation in pediatric neuropsychiatric disorders (http://www.stiped.eu/home/)
- Protocol optimization for MRI and fMRI analysis.
- Study of functional brain mechanisms underlying tDCS-related effects.

PROFESSIONAL SERVICE

Symposium Co-Organizer
- 7th Iberian Congress on Perception, Coimbra, 2017
- Medical devices in brain research: from design to clinical application, Coimbra, 2016

Peer-Reviewed Articles for:
- Science: 1
- Scientific Reports: 1
- Brain Connectivity: 1

LANGUAGES

Portuguese: Native Language
English: CEFR Level C1 (Proficient User)
Spanish: Novice

COMPUTER SKILLS

Programming: R, Python, MATLAB
Research-related software: BrainVoyager, Turbo-BrainVoyager, SPM12, FSL, CONN Toolbox, LaTeX

OTHER

- Amateur Violinist: completed the course of the Music Conservatory of Coimbra.
- Concertmaster at the Academic Orchestra of the University of Coimbra.
- Erasmus Student at Aalto University, Espoo, Finland, completing courses related to Data Mining, Machine Learning and Neural Networks, Signal Processing in Neuroinformatics, Human Brain Functioning and Cognitive Neuroscience.