



UC San Diego Cognitive Science

Alessandro D'Amico's Dissertation Defense

Towards Large Scale Naturalistic EEG Data Collection using Video Games

Wednesday, August 26, 2026

2:00 - 4:00 pm, Cognitive Science Building, Room 180

or <https://ucsd.zoom.us/my/ollied>

Abstract:

Scalp electroencephalography (EEG) has proven to be a valuable tool for understanding cognition and for creating assistive devices such as brain-computer interfaces (BCIs). Progress in amplifier and electrode design has made it possible to use portable systems to record EEG data outside of the laboratory. At the same time, advancements in signal processing and machine learning enable neural activity to be decoded from increasingly complex cognitive tasks. Combined, these technological improvements open a path towards robustly studying the brain in nonlaboratory environments, creating realizable BCIs that require less subject-specific calibration, and analyzing ecologically valid contexts like video game playing, leveraging complex factorial designs.

My dissertation focuses on three independent studies that each record various event-related brain potentials (ERPs) using scalp EEG. The first explores unexpected findings from a P3b-based BCI speller. The second validated a popular low-cost EEG amplifier's ability to accurately record P3b, N4, and error-related negativity (ERN) components. The final demonstrates that video games can elicit and modulate the P3b, and that experimentally manipulated multidimensional game events may produce distinct, feature-specific P3b components.

Committee members:

Dr. Virginia de Sa (Chair) - UCSD Cognitive Science

Dr. Gert Cauwenberghs - UCSD Bioengineering

Dr. Andrea Chiba - UCSD Cognitive Science

Dr. Seana Coulson - UCSD Cognitive Science

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