

## Faculty Information

### Luca Aquili

#### Specialization:

- Accounting and Finance (AF)

#### Research Area:

Neurofinance, Neuroeconomics, Behavioral Neuroscience, Financial Decision-Making, Risk and Reward Processing, Dopaminergic Systems and Economic Behavior.

#### Keywords:

Optimism bias, L-DOPA, haloperidol, tolcapone, delay discounting, fMRI, PET, risk-taking behavior, financial stress, genetic polymorphisms, DRD2, DRD4, COMT, DAT1, inequity aversion, dopamine, reward processing, machine learning, neuroeconomic paradigms, decision neuroscience, financial generosity.

#### Seminar Topic:

This seminar explores the neuroscience of risk-taking, decision-making, and economic choices, offering a deeper understanding of how dopamine influences key aspects of financial behavior. Specifically, we will investigate how this neurotransmitter shapes optimism bias (and its role in financial profit predictions), responses to bonuses, risk-taking in financial decisions, the impact of financial stressors, decision-making processes, financial generosity, inequity aversion, and delay discounting.

To address these questions, students will engage with cutting-edge neuroscience methodologies, including evidence from pharmacological studies (e.g., L-DOPA, cabergoline, haloperidol, and tolcapone), neuroimaging techniques (e.g., fMRI and PET), and genetic analyses (e.g., polymorphisms in D2, D4, DAT1, DRD2, DRD4, and COMT).

Additionally, students will have the opportunity to apply advanced machine learning and statistical techniques to analyze existing datasets or design behavioral economic paradigms for experimental use. Depending on feasibility, we may also explore integrating behavioral approaches with neuroscience techniques such as transcranial direct current stimulation (tDCS) to further investigate decision-making mechanisms.

#### Seminar Teaching Method:

Students will engage in interactive discussions, group presentations, and hands-on activities to explore key concepts. The seminar emphasizes both the analysis of research literature and practical exposure to analytical and experimental techniques, including data-driven approaches and the design of behavioral economic tasks. As the course progresses, students are encouraged to work more independently, applying their skills through projects that may involve data analysis, experimental design, or the integration of behavioral and neuroscience methodologies to investigate financial decision-making.

## Possible Research Topics for Students:

### Master's Thesis

#### Potential topics:

- 1) Dopamine and the Bottom Line: Investigating Optimism Bias in Financial Forecasting under Pharmacological Manipulation.
- 2) Delay Discounting and Financial Planning: A Neuroeconomic Perspective on Future-Oriented Decision-Making.
- 3) The Neuroscience of Financial Generosity: How Dopamine and Inequity Aversion Influence Bonus Allocation Decisions.
- 4) Predicting Risk-Taking in Financial Markets Using Machine Learning and Neuroeconomic Markers.
- 5) Financial Stress and Decision Noise: How Acute Pressure Modulates Dopamine-Driven Risk Behavior.

### Research Method:

Research methods may include behavioral experiments, pharmacological interventions, analysis of existing genetic and neuroimaging datasets, non-invasive brain stimulation (e.g., tDCS, tRNS), and machine learning for data analysis.

### Comments:

This seminar may be particularly beneficial for students considering Ph.D. studies and a potential career in academic research. It offers an opportunity to engage with research-oriented thinking, analytical methods, and experimental approaches commonly used in fields such as neuroeconomics, behavioural finance, and decision science. Students who are intellectually curious, enjoy analyzing complex problems, and have an interest in how neuroscience intersects with financial decision-making will find this seminar especially valuable. It will expose them to advanced research methodologies and help them develop skills that could be useful if they choose to pursue further academic opportunities.

### APU Researcher Database:

<https://researcher.apu.ac.jp/apuhp/KgApp?resId=S001738&Language=2>