



# Imen Bouhlel

*Postdoctoral Fellow*

## Postdoctoral Fellow (since September 2022)

Title Postdoctoral research assistant in economics, *Université Côte d'Azur*, GREDEG, France  
Subject Modelling transition towards recycling while observing consumer preferences  
PI Professors Nathalie Lazaric and Paolo Zeppini

## Lab Manager (since 2014)

Title *Lab Manager of the Laboratory of Experimental Economics of Nice (LEEN, <http://leen.unice.fr>)*  
Description Development and management of the online recruitment system for economic experiments  
Integration of online experiments  
Server and experiments administration  
Support to pedagogical innovation within the University  
Initiation of high-school students to Experimental Economics

## Lecturer (September 2021 - August 2022)

Title Lecturer (ATER), *Université Côte d'Azur (ELMI-Graduate Scholl of Economics and Management)*, GREDEG, France  
Description Microeconomics, Statistics

## Postdoctoral Fellow (January-December 2020)

Title Postdoctoral research assistant in economics, *Université Côte d'Azur (SKEMA)*, GREDEG, France  
Subject Theoretical modeling of individual multi-attributes sequential search with recall : Example of air-travelling booking behavior.  
Description We extend the multi-attributes search model of Lim et al (2006, Sequential Search with Multi-Attribute Options, DecisionAnalysis), in which we incorporate the possibility of recalling previously rejected alternatives. We then compare the results of our theoretical model to optimization-based numerical simulations using hill-climbing with random restarts algorithm. Our model can be applied to describe air-traveling booking behavior.  
PI Professor Zakaria Babutsidze

GREDEG, 250, rue Albert Einstein – 06560, Valbonne

☎ (+33)(0)6.29.36.46.51 • ✉ [Imen.bouhlel@gredege.cnrs.fr](mailto:Imen.bouhlel@gredege.cnrs.fr) • 🌐 [imenbouhlel.com](http://imenbouhlel.com)

1/6

---

## Education

2014-2019 **PhD Thesis in Economics**, *Université Côte d'Azur*, GREDEG, France.

Title Essays on the exploration-exploitation dilemma

Supervisors Pr. Agnès Festré and Pr. Eric Guerci

Thesis Committee Pr. Agnès Festré, Pr. Eric Guerci, Pr. Luigi Marengo and Pr. Nicolaas J. Vriend

Abstract A growing body of empirical evidence during the two last decades has been showing inconsistencies between individual choices when the individuals make decisions from description (i.e., when they are provided with a perfect knowledge about the states space, including all the possible outcomes, and the underlying probabilities), compared to when they make decisions from experience (i.e., when they do not know all the possible outcomes or/and their occurrence probabilities). These inconsistencies are referred to as the description/experience gap. Undersearch has been pointed out as one of the key determinants of this gap. Hence, even though little studied in economics, search becomes a central question, deserving serious interest. This thesis aims at contributing to the theoretical and experimental literature studying search and the related exploration-exploitation dilemma, both at the individual and at the collective level. The thesis is made of 3 essays, combining theoretical, agent-based modelling, evolutionary simulations and laboratory experiments. The first chapter of this thesis examines the determinants of search behavior in the context of an individual optimal stopping problem and shows that this behavior largely depends on the degree of certainty of the information, and is affected by both regret and anticipation. The second chapter investigates information sharing behavior in competitive collective search using agent-based and evolutionary simulations. It finds robust evidence for the individual benefits of sharing, even when others do not reciprocate, as long as two mechanisms are present : Imitation with a certain level of innovation and local visibility. The third chapter experimentally tests and supports the validity of these results, and stresses the crucial role of learning.

2013-2014 **Master 2 in Behavioral Economics, Knowledge and Organization**, *University of Nice*, France.

2012-2013 **Master 2 in Mathematical Engineering, Speciality : Economics, Finance, Actuarial**, *University of Nice*, France.

2011-2012 **Master 1 in Mathematical Engineering and Applied Economics**, *University of Nice*, France.

2008-2011 **Licence in Applied Mathematics and Social Sciences**, *University of Nice*, France.

---

## Research interests

My main research interest is in behavioral and experimental economics. In general, I am interested in individual decision-making, but also in learning dynamics and social interactions. More specifically, my research revolves around a central theme which is that of the "search" process. I study from an individual point of view questions such as "Satisficing", optimal stopping problems, the exploration-exploitation dilemma and regret. From a collective point of view, I am interested in questions of imitation, innovation and information sharing during competitive research. In order to study these different questions, I use a combination of tools, such as experimental economics, agent-based modelling, theoretical analysis and numerical simulations, and I collaborate with disciplines such as cognitive sciences.

---

## Publications

- 2022 **When to stop searching in a highly uncertain world? A theoretical and experimental investigation of “two-way” sequential search tasks**, with *Michela Chessa, Agnès Festré and Eric Guerci*, *Journal of Economic Behavior and Organization*.

When to stop exploring is crucial in contexts where learning to manage time and uncertainty is critical for carrying out successful initiatives (e.g., innovation, personnel recruitment, vaccine discovery). We investigate analytically and experimentally the exploration-exploitation trade-offs in such contexts. A “two-way” sequential search task is proposed, where the classical exploration-exploitation trade-off in sequential decisions with finite-horizon is coupled with a further one about discovering the real value of each alternative. The longer the time spent on a specific alternative, the higher the certainty about its expected value but at the higher cost of an under-exploitation of the best alternative so far explored. People learn better when to stop the more certain the information is. A potential behavioral trap in the exploration of “two-way” search tasks is identified that brings towards local optima. We recommend policies that induce people to reduce the time spent exploring the alternatives.

**Download link**

- 2019 **The Evolutionary Dynamics of Cooperation in Collective Search**, with *Alan N. Tump, Charley M. Wu and Robert L. Goldstone*, In A. K. Goel, C. M. Seifert, & C. Freksa (Eds.) , *Proceedings of the 41th Annual Conference of the Cognitive Science Society* (pp. 883–889).

How does cooperation arise in an evolutionary context? We approach this problem using a collective search paradigm where interactions are dynamic and there is competition for rewards. Using evolutionary simulations, we find that the unconditional sharing of information can be an evolutionary advantageous strategy without the need for conditional strategies or explicit reciprocation. Shared information acts as a recruitment signal and facilitates the formation of a self-organized group. Thus, the improved search efficiency of the collective bestows byproduct benefits onto the original sharer. A key mechanism is a visibility radius, where individuals have unconditional access to information about neighbors within a limited distance. Our results show that for a variety of initial conditions—including populations initially devoid of prosocial individuals—and across both static and dynamic fitness landscapes, we find strong selection pressure to evolve unconditional sharing.

**Download link**

- 2018 **Sharing is not erring : How environments can encourage pseudo-reciprocity in collective human search**, with *Charley M. Wu, Nobuyuki Hanaki and Robert L. Goldstone*, In T.T. Rogers, M. Rau, X. Zhu, & C. W. Kalish (Eds.) , *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 156-161).

Information sharing in competitive environments may seem counterintuitive, yet it is widely observed in humans and other animals. Companies often release technologies under open source license and scientists openly publish their research, often sharing free-to-access versions of their papers, rather than only publishing in restricted access journals. What drives this behavior and in which environments can it be beneficial? Using simulations in both static and dynamic environments, we show that sharing information can lead to individual benefits through the mechanisms of pseudo-reciprocity, whereby shared information leads to by-product benefits for an individual without the need for explicit reciprocation. Crucially, imitation with a certain level of innovation is required to avoid Roger’s paradox, while the novel mechanism of a local visibility radius allowed for the coordination of self-organizing collectives of agents. When these two mechanisms are present, we find robust evidence for the benefits of sharing—even when others do not reciprocate.

**Download link**

---

## Ongoing Work

### **Now you see me, now you don't : Effect of local visibility on information sharing behavior in competitive collective search**, with *Charley M. Wu, Nobuyuki Hanaki and Robert L. Goldstone*.

Information sharing in competitive environments is a phenomenon observed in both humans and animals. Companies often release their technologies and innovations under an open-source license, allowing free access to their work, and taking the risk to see others benefiting from it by copying or building upon it, without bearing its costs. Many animal species also signal the location of the food that they find to their conspecifics, increasing the competition for it. We study the drivers and determinants of this behavior. Using agent-based simulations, we show that sharing information can lead to individual benefits through the mechanisms of pseudo-reciprocity, without the need for explicit reciprocation, as long as the followed search strategy entails imitation with a certain level of innovation. We also find using evolutionary simulations that the unconditional sharing of information can be an evolutionary advantageous strategy without the need for conditional strategies or explicit reciprocation. We test the results of the model experimentally with human subjects and find the local visibility mechanism improves individual performance and gives rise to sharing benefits. Learning is however essential in order to observe these benefits. We also find that participants sharing behavior is conditional on the observed rewards, where they tend to withhold information about higher rewards.

### **Theoretical modelling of air-travelling booking behavior**, with *Zakaria Babutsidze and Michela Chessa*.

We extend the multi-attributes search model of Lim et al (2006, Sequential Search with Multi-Attribute Options, DecisionAnalysis), in which we incorporate the possibility of recalling previously rejected alternatives. We then compare the results of our theoretical model to optimization-based numerical simulations using hill-climbing with random restarts algorithm. Our model can be applied to describe air-traveling booking behavior.

### **Inattention in multi-attribute search : an experiment**, with *Bora Lancee and Stephanie Rosenkranz*.

Humans do not have infinite attention. Contrary to what traditional economic models would predict, only a subset of all available alternatives are considered for most decisions one makes in a lifetime. On top of this, only a limited number of attributes of these alternatives are taken into account. We study how choices between alternatives and the associated search behavior change when an optimal search strategy is communicated. We do so by implementing a treatment manipulation targeting the amount of search and studying inattention as a moderator. Our experimental study expands the recent work on inattention. We design and implement an online search experiment with a representative UK sample, in which we study the relationship between inattention and the amount of search, and research if we can adjust the amount of search by the communication of an optimal strategy. We find that search behavior is better predicted with partial attention. Additionally, the level of inattention depends on the attribute's importance—the more important the attribute, the higher the level of attention allocated. Secondly, our intervention has a converging effect on search behavior, where so-called "over-searchers" diminish their search while "under-searchers" increase their search levels towards the communicated optimum. Lastly, we find that inattention levels have a moderating role in the shift of search behavior for the group of over-searchers.

### **Cognitive Hysteresis in a Repeated Ultimatum Game**, with *Eric Guerci and Alan Kirman*.

Decision inertia is a widely observed phenomenon in many real life situations, particularly under uncertainty. It consists of the tendency to repeat previous choices regardless of whether their past outcome was advantageous or not (Alós-Ferrer et al., 2016; Dutt and Gonzalez, 2012; Sautua, 2017; Jung and Dorner, 2018). This reluctance to incorporate new information in choices thus gives rise to perseveration in the same, possibly suboptimal choices. This phenomenon is a well-known phenomenon in judgement and decision-making research (Erev and Haruvy, 2016), and a number of studies show that decision inertia can explain many decision-making anomalies and suboptimal economic decision-making such as disadvantageous economic belief-updating (Alós-Ferrer et al., 2016; Charness and Levin, 2005), suboptimal investment decisions (Sandri et al., 2010), or the competitive sale dilemma (Liu, 2018). Our interest is in the mechanisms at work in the short term and how these may lead people to persist in certain judgments or decisions depending on their own recent decisions and their related experience. More particularly, we focus on inertia in a particular type of decision-making, that is decision-making in the presence of strategic interactions, and we are interested in how the perception of fairness can be context-dependent. In a series of experiments, we want to analyze subjects' judgments as to what they judge to be acceptable offers in repeated ultimatum games and analyze the extent to which there is evidence of adaptation to previous experience resulting in short-term hysteresis or inertia.

---

## Conferences and Workshops

- Jul 2022 ASFEE (French Association of Experimental Economics) conference, Lyon, France
- Sep 2021 ASFEE (French Association of Experimental Economics) conference, Dijon, France
- Sep 2019 European ESA (Economic Science Association) meeting, Dijon, France
- Jul 2019 BEAM (Behavioral and Experimental Analyses in Macro-finance) workshop, Dijon, France
- Jun 2019 ASFEE (French Association of Experimental Economics) conference, Toulouse, France
- Jan 2019 GREDEG (Research Group in Law, Economics and Management) seminar on Experimental Economics, Nice, France
- Dec 2017 GREDEG (Research Group in Law, Economics and Management) seminar on Experimental Economics, Nice, France
- Jun 2017 ASFEE (French Association of Experimental Economics) conference, Rennes, France
- Apr 2017 GREDEG (Research Group in Law, Economics and Management) seminar on Experimental Economics, Nice, France
- Jun 2016 WEHIA (Workshop of Economics With Heterogeneous Interacting Agents) workshop, Castellon, Spain
- Jun 2016 ASFEE (French Association of Experimental Economics) conference, Paris, France
- Feb 2016 GREDEG (Research Group in Law, Economics and Management) seminar on Experimental Economics, Nice, France

---

## Summerschools

- Jun 2018 Summer Institute on Bounded Rationality, Berlin, Germany
- Jul-Aug 2016 IMPRS summer school, Jena, Germany
- Nov 2015 CNRS thematic summer school MAPS 8 on Agent based Modeling of Spatialised Phenomena, Colle-sur-loup, France
- May 2015 WEHIA - Doctoral Summer School, Nice, France

---

## Teaching Experience

- 2021-2022 **Data Collection and Visualization**, *Lectures*, Graduate (M1), Université Côte d'Azur.
- 2021-2022 **Statistics**, *Tutorials*, Undergraduate (L1), Université Côte d'Azur.
- 2021-2022 **Microeconomics**, *Tutorials*, Undergraduate (L1), Université Côte d'Azur.
- 2020-2021 **Economic Environment**, *Lectures*, Undergraduate (L1), Université Côte d'Azur.
- 2017-2018 **Behavioral and Experimental Economics**, *Lectures*, Undergraduate (L3), Université de Nice.
- 2014-2018 **Statistics**, *Tutorials*, Undergraduate (L1), Université de Nice.
- 2014-2015 **Microeconomics**, *Tutorials*, Undergraduate (L1), Université de Nice.

---

## Organization Experience

- December 2018 **Annual Meeting of the Lab Managers of France**, *Member of the Organizing committee*, Nice, France.
- June 2018 **9<sup>th</sup> Annual Conference of the French Association of Experimental Economics (ASFEE)**, *Member of the Organizing committee of the conference*, Nice, France.
- May 2015 **20<sup>th</sup> Annual Workshop on the Economic Science with Heterogeneous Interacting Agent (WEHIA)**, *Member of the Organizing committee of the WEHIA Doctoral Summer School*, Nice, France.

## Research and Skills

- Research Interests Behavioral and Experimental Economics, Individual Decision Making, Search, Optimal Stopping Problems, Exploration-Exploitation dilemma, Social Interactions, Learning Dynamics
- Competences Statistics, Econometrics, Data Analysis, Experimental Methodology, Numerical Simulations, Agent-based Modeling
- Tools **Statistics & Econometrics** : R; **Experiments** : Ztree, oTree; **Agent-based** : Netlogo; **Informatics** : Python, Css, Html, Javascript, jQuery, MySQL, C, C++, Java, VBA