Generally speaking, the area of optimal stopping is concerned with observing a certain process evolving in time and choosing the best moment to stop observing and start acting. In fact, most of us, in our daily routine, have to take such stopping decisions and intuitively try to do it optimally: while looking for a parking place, while hunting for the best job offer, while looking for information on the internet, while trying to hire the best employee, while deciding when to replace a machine, ect. One may also easily imagine really serious problems of that character that need taking on-line decisions, e.g. when to stop observing a coming tornado and start evacuating people from the area of risk or when to finally stop debugging and launch a large project.

All given examples may be described formally by mathematical models in which a selector chooses a time to take an action maximizing the expected payoff (similarly, maximizing the probability of winning) or minimizing the expected cost (similarly, minimizing the probability of losing). Due to this mathematical description and mathematical tools it is often possible to find optimal solutions. Nowadays optimal stopping has become an independent area of mathematics lying somewhere between probability theory and optimization. Even though it evolved in early 1960's from a recreational issue, called marriage problem, in which one has to decide when to stop dating and propose to a certain candidate, the mathematical machinery developed from this time is nowadays widely applied in data mining, economics, statistics and operations research.

Our research project focuses on optimal stopping methods for finding appropriate decision tools to ensure the safety of sending information in terms of stopping transmition when the danger of leaking the information is too high, maximizing the probability of choosing a right element when we have to choose it on-line while browsing a computer network with known or unknown structure (this element may be a piece of information or a server we want to contact.), decide, while only a partial information is available, about reaching a certain desired or undesired stage in a process when moving on is unprofitable so that we have to stop immediately. These decision problems require in many instances new mathematical tools which we want to develop.