

# Master's thesis proposal

## What makes a winning fantasy football team?

Julie Rowlett<sup>1</sup> and Jil Klünder<sup>2</sup>

<sup>1</sup>Mathematical sciences, Chalmers University and the University of Gothenburg

<sup>2</sup>Institut für Praktische Informatik, Leibniz Universität Hannover

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The goal of this thesis is to develop an empirical counterpart to the supervisors' recent theoretical works [3, 4, 7]. Their theory describes how the composition of individuals within a team affects its success in competition against other teams. We are looking for two students with strong mathematical and computation backgrounds, for example from the master's programs MPENM, MPCAS, MPDAT, MPALG, but students from other programs with excellent programming and mathematics skills are also welcome to apply. Interest in sports in general and football (soccer) in particular could be beneficial.

We would like to answer the question: what are the characteristics of a winning fantasy football team? In fantasy football, one creates a team comprised of real-life players who need not in reality play on the same team. Then, one follows the players' performances during the season and according to the specific fantasy football rules, this determines how the fantasy team performs. We will analyze fantasy football teams using statistics from previous years. To begin, we will start with a single year, like 2018. The students will build a database of UEFA football (soccer) statistics from 2018. Next they will write a software that determines the performance of a given team; specifically given eleven players the software outputs a number that is determined by the statistics of those eleven players over the 2018 season according to the fantasy football point system. This will be used to rank the teams from best (highest number) to worst (lowest number). In addition, the mean salary of each team will also be computed. Teams will then be sorted into those with approximately the same mean salary and then ranked from best to worst within each salary group. Initially, we will allow teams to have duplicates, and we will not specify player positions like goalie, forward, etc. To refine the study, we will then restrict to teams that do not allow duplicates and if feasible, teams in which the players are matched with positions (like a team must have precisely one player who is a goalie, etc). Once this code is in place, we will repeat the process with several years. If feasible,

we may also explore teams comprised of players from different years.

One may reasonably expect that the teams with the highest mean salary will outcompete the teams with the lowest mean salary. For teams with approximately the same mean salary, what are the characteristics of the best (and worst) performing teams? We will study the rankings of these fantasy teams, sorted into groups of approximately the same mean salary, to identify common features of successful teams. Although there is significant interest in predicting winning fantasy football teams, to the best of our knowledge this particular analysis does not exist in the literature. Consequently, this will be a novel contribution. Although the research in this thesis is based on football teams, the results will provide insights for numerous contexts in which ensembles of individuals compete, similar to the myriad of contexts to which the general theory of [7] applies. The last part of the thesis will compare and contrast our analysis with the current literature and methods for building successful fantasy football teams, including but not limited to [1, 2, 5, 6, 8] and references therein. The students will study existing methods for building ‘dream teams’ and explore the feasibility of combining such methods with our novel analysis to build dream teams subject to a constraint on the mean salary of the team.

## References

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