

## MASTER'S THESIS PRESENTATION

# The Application of Normal Linear Mixed Effect Models ---- For Female Fulmar Reproductive Activity

## WHEN

May 10, 2022

2:00 PM

## WHERE

Zoom Meeting

For ZOOM presentations, details will be provided in an email announcement for this seminar.

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The northern fulmar is a seabird found mainly off the coasts of Western Europe. In this thesis, we focus on reproductive activity and its relation to the breeding age of female fulmars. The study is based on the 2011 paper \textit{Static and dynamic expression of life history traits in the northern fulmar Fulmarus glacialis} by Orzack, Steiner, Tuljapurkar, and Thompson (Oikos 120: 369–380). The original study of the fulmars was started in 1951 by Robert Carrick and George Dunnet. The data for this paper concern the breeding records of 428 adult female birds for the period from 1958 to 1995. Our goal is to find the factors that affect the fulmars' breeding success. We first look at the mean reproductive score of each bird in each calendar year. Some birds are more successful breeders than others, and some calendar years are more favorable than others, so we must make allowances for such effects. By the definition of breeding age, the first and last breeding age always have non-zero reproductive scores, so the mean score of the first breeding age is higher than the mean score at other non terminal breeding age. The mean score of the first reverse breeding age is also higher. Thus, we should treat the first and last breeding age differently from the rest of breeding ages. We use the normal linear mixed effect models(LMM) to analyze reproductive activity and its relation to the breeding age. We figure out that there exists a correlation between the reproductive values of the same bird at two breeding ages, which decrease as a function of time.

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