

# Linear and Nonlinear Mixed Effect Models with Application in Aging

A three-day workshop for PhD, early and mid-career researchers  
12 – 14 December 2023

The ARC Centre of Excellence in Population Ageing Research (CEPAR) is proud to offer this 3-day workshop for early career researchers.

## Introduction

This three-day short course's main goal is to provide Ph.D. students and postdoctoral fellows with an introduction to advanced analytical methods commonly used in scientific articles to model change of continuous outcomes (i.e. cognitive scores, some measure of physical function) over time in aging research. This applied short course will use real data examples to review advanced modern methods used to evaluate change in cognition over time. These models are used to ascertain (a) linear change over time depending on predictors at baseline and time-varying (b) linear change over time before and after a known event (i.e. new medication intake or diagnosis of a condition that may be associated with the function of interest), (c) the onset of accelerated change (i.e. fixed and random change point models commonly used to study terminal decline), (d) half-decline of nonlinear curves thru the sigmoidal model (such as the sigmoidal curves postulated in Jack's model) and (e) and the shape of the trajectory using sigmoidal model and other strategies.

The course is intended for PhD students and Early to Mid-Career Researchers across disciplines (i.e. in fields such as industrial relations, organisational behaviour, sociology, law, education, public health and beyond).

## Presenter's Biography

### Associate Professor Ana Capuano

Dr. Ana W. Capuano, Ph.D., is an associate professor and biostatistician at Rush University Medical Center. She is the co-leader of the Data and Statistical Core of the Rush Alzheimer's Disease Research Center and a faculty Biostatistician of the Rush Alzheimer's Disease Center. She has taught workshops similar to the proposed workshop at large conferences as well as Universities such as Stanford University. Capuano serves as the elected chair of the executive committee of the Design and Data Analytics, a Professional Interest Areas (PIA) assembly of ISTAART (The Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment), with over 304 Members from countries such as USA, Sweden, Japan, Belgium, Mexico, Spain, Australia, Costa Rica, Poland, Ireland, and others. With over 100 original peer-reviewed publications, as of 4/2023, Capuano's work was cited more than 5500 times. She worked on several international, multi-racial, multi-language studies and collaborates with psychologists, neurologists, neuroscientists, and other researchers in the application of modern statistical methods in epidemiological studies and clinical trials that seek to understand

environmental and behavioral risk factors for age-related conditions. Capuano’s methodological interests include longitudinal models, non-linear mixed models, constrained ordinal class of models, methods in resilience, and study design in disparity research.

Dr Capuano will invite experts in the field to contribute via Zoom to a portion of the course such as Dr. Donald Hedeker from the University of Chicago.

## Workshop Schedule

<b><u>Day 1 (December 12<sup>th</sup>):</u></b>	<b><u>Day 2 (December 13<sup>th</sup>):</u></b>	<b><u>Day 3 (December 14<sup>th</sup>):</u></b> <b>(optional for participants who want to write abstracts with their own data)</b>
<ul style="list-style-type: none"> <li>• Linear mixed-effects models and when to use them</li> <li>• R codes</li> <li>• Introduction to nonlinear-mixed effect models</li> <li>• Spline based models</li> <li>• Fixed change-point models</li> <li>• Random change-point models</li> </ul>	<ul style="list-style-type: none"> <li>• Practical activity in R with given data</li> <li>• Advanced of Nonlinear-mixed effect models</li> <li>• Further practical activities in R with given data</li> </ul>	<ul style="list-style-type: none"> <li>• Hands-on activity in R - analyse your data</li> <li>• Finalise analyses and write an abstract with the results</li> </ul>

## Requirements:

The workshop is designed for PhD students and above. Good working knowledge of multiple regression models is desirable. Participants must have their own laptops to work from for the duration of the Workshop.

## RSVPs

RSVP via email to [a.brushwood@unsw.edu.au](mailto:a.brushwood@unsw.edu.au) by the close of business 10 November 2023. Places are limited.

## Cost

There is no charge for the workshop. The workshop is supported by funding provided to CEPAR by the Australian Research Council to support the training of Early Career Researchers.

## Key Dates

<b>10 November</b>	RSVPs close
<b>17 November</b>	Outcomes advised
<b>12-14 December</b>	Workshop

## Enquiries

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