Curriculum Vitae, October 2024

Rafael de Andrade Moral, PhD

1 Contact Details

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2 Summary of Academic Profile

- PhD in Statistics experienced in the Irish University system.
- Successful leader at departmental, faculty and statistical community levels.
- Enthusiastic Statistics educator, renowned worldwide for my innovative teaching methods.
- Highly ambitious and driven researcher, having built an international reputation as an expert in Statistics and its applications to Ecology, Biology and Agriculture over the past 16 years.
- A total of 95 peer-reviewed journal publications (28 as lead/senior author), 73 conference publications (39 as lead/senior author), 5 book chapters, 1 edited book, 1 complete book, and 8 software packages. Citations: 1853, h-index: 18, i10-index: 39 (source: Google Scholar 24 October 2024).
- Recognised in Ireland and abroad for my involvement with Statistics outreach, with over 200,000 views of my educational videos and over 1 million views of my Science Communication videos.
- Leader of the worldwide education efforts of the International Biometric Society as Chair of the Education Committee, and member of executive committees of societies in Ireland and the UK.

3 Education and Employment

Jul/2023 – present	Associate Professor of Statistics at Maynooth University
Sep/2018 – Jun/2023	Lecturer/Assistant Professor of Statistics (permanent) at Maynooth University
Jan/2018 – Aug/2018	Lecturer/Assistant Professor of Statistics (contract) at Maynooth University
Jan/2016 – Jan/2017	Visiting scholar, University of Galway
Feb/2014 – Dec/2017	PhD in Statistics, University of São Paulo, Brazil
Mar/2013 – May/2013	Visiting scholar, University of Galway
Feb/2012 – Jan/2014	MSc in Statistics, University of São Paulo, Brazil
Jul/2010 – Dec/2010	Visiting scholar, Penn State University, USA
Feb/2007 – Jan/2013	BSc and BEd in Biology, University of São Paulo, Brazil

4 Prestigious Awards

2022 Maths Week Award for Outstanding Contributions in Raising Public Awareness of Mathematics

2021 A-mu-sing Competition, 1st place, United States Conference on Teaching Statistics, Consortium for the Advancement of Undergraduate Statistics Education, USA

2021 Teaching Hero Award, National Forum for the Enhancement of Teaching and Learning in Higher Education and the Union of Students in Ireland

2018 Young Statistican Showcase Award, International Biometric Society

2018 Certificate of Recognition, Piracicaba City Council, São Paulo, Brazil

2016 Best student oral presentation at the 31st International Workshop on Statistical Modelling, Statistical Modelling Society

2013 "Luiz de Queiroz" award for highest academic average, University of São Paulo

5 Leadership

Leadership Roles (Administration)

Chair and Lead Statistician at the Biomedical & Life Sciences Ethics Committee

I have served as lead statistician in the University's Ethics Committee (Biomedical) since October/2019. I am responsible for examining experimental design, sample size calculation, proposed statistical treatment of the data, and data protection plans. This is a significant and impactful administrative role, in which I serve all faculty members, which is pivotal to allowing researchers in the faculty to obtain approval from other ethics boards (such as the Health Products Regulatory Authority) and establish their experiments. My work in this committee makes a difference in terms of animal welfare, assurance of data protection standards, and compliance with GDPR, and I took over the role of Chair of this committee in January/2023.

Chair of the Education Committee of the International Biometric Society

The International Biometric Society is one of the largest statistics societies in the world. I have been elected chair of the Education Committee in January/2024. This committee implements the educational vision of the society, fostering biostatistics and the biometry profession worldwide by financially supporting and promoting events, courses, workshops and distinguished lecture series.

Course Coordination

I acted as the Coordinator of the Higher Diploma Data Analytics at Maynooth University from 2019 until 2024. My duties included securing funding from HEA's Springboard+ initiative, advertising the programme, assessing applicant academic eligibility, making sure registered students activate the payment from Springboard+, and following up with graduates to register outcomes in the Springboard+ system. I led the application for Springboard+ funding in January/2020, and was successful in obtaining funding for three consecutive years, for a total of €515,500 in student tuition fees. I am also the main point of contact with industry, and since assuming the position in 2019 I have made contact with representatives from Meta/Facebook, Allied Irish Banks, British Telecom, Real World Analytics, Clavis Insight, Derilinx, the HSE, Accenture, Pfizer, Crème Global, Compass Informatics, and Danone. This has brought direct internship and employment opportunities to many students, who thereby finished their degree having already secured employment.

Chair of the Young Statisticians's Section of the Irish Statistical Association

I have co-founded the executive committee of the Young Statisticians' Section of the Irish Statistical Association in December/2018. Since then, I have led the organisation of nationwide webinars, workshops, poster competitions and three full-day events aimed at early career statisticians in Ireland. I have also represented Ireland at the Young Statisticians Europe meeting in Romania in 2019. Under my leadership, the Young-ISA has recently flourished into the most active section of the ISA, cultivating a network and supporting the development of career-young statisticians in Ireland. I was Chair of this committee from May/2021 – May/2023

President of the North Kildare Maths Problem Club

I led the promotion of access to wider participation in higher education as the President of the North-Kildare Maths Problem Club (NKMPC), serving as Vice-President from 2019 – 2021, and as President from 2021 – 2023. I led the organisation of the training sessions and preparation for the Irish Mathematical Olympiad exams for secondary school students.

Organiser of the Colloquium Series

I was the organiser of the Mathematics and Statistics Colloquium Series for the 2018-19 academic year, which took place weekly during term. I invited 30 academics, 14 based in Ireland and 16 abroad.

Leadership Roles (Research)

Founder and Director of the Theoretical and Statistical Ecology Group

In 2021 I founded the Theoretical and Statistical Ecology Research Group. Through this initiative, I have established an internationally recognised webinar series, and have drawn the attention of several prospective graduate students who wish to undertake a PhD in the area as part of the group. Currently, the group includes both national and international collaborators, as well as PhD researchers working on the interface between Statistics, Mathematics and Ecology. Under my leadership we are developing new statistical methods aimed at improving animal conservation and management strategies worldwide.

Associate Editorship of Statistical Journals

I have served as an Associate Editor for the R Journal since 2020 and for the Brazilian Journal of Probability and Statistics since 2021. The R Journal is the open-access journal of the R Foundation, and is a leading journal in the area of statistical computing. The R software is the most widely used statistical software in the world, and therefore editorship of the R Journal is a significant leadership role in the statistics community, which speaks to my reputation and skill in the area.

Lead Editorship/Authorship of Books

I led the production of the book "Modelling Insect Populations in Agricultural Landscapes", published by Springer in January/2024, involving 24 researchers from 11 institutions worldwide. I am the senior author of a book on Generalized Linear Models (launched in August/2024 at the Brazilian Symposium of Probability and Statistics), written in Portuguese with two globally respected researchers on the field (Prof Gauss Cordeiro and Prof Clarice Demétrio), who are based in Brazil. I am currently co-editing a book approved by Springer on "Wildlife monitoring: Integrating conservation and innovation in human-altered landscapes", to be finalised in 2025.

Lead Statistician in Grant Proposals

I am the Lead Statistician in live projects and grant proposals under review. I am responsible for designing all experiments or observational studies, and analyse the data resulting from them.

Lead Organiser of Events

I have led the organisation of several events, including the Workshop on Ecological Data Analysis at Maynooth University, the Young-ISA webinar series, three Young-ISA live events, and poster competitions, and virtual conferences on statistics education in collaboration with academics from the USA, all with a great level of engagement with both the Irish and international statistics community.

Lead Statistician for Risk Assessment Analysis

I have led the risk assessment analysis for the commercial release of nine strains of yeast that were genetically modified to be more efficient when producing biofuels. This was in collaboration with multinational companies based in Brazil. Since Brazil uses ethanol as a fuel countrywide, my leadership in these analyses had enormous impact on ethanol availability and price.

Leadership Roles (Teaching)

Led Teaching Innovation at Maynooth University

By creating new and innovative teaching methods based on music, my efforts have established me as a recognised international leader in teaching innovation. My methods have drawn institutional, national and international attention. I write and record songs using professional-grade equipment and software, having had over 200,000 views on Youtube and X/Twitter. From this exposure I was invited by the Department of Health to produce videos for their Science Communication initiative, which have accumulated over 1 million views to date. My innovative work with the Department of Health was featured by the Irish Times and the Irish Independent, and recently my academic work was featured by the Irish Times.

6 Research Achievements

Research Profile

- International reputation as leading expert in statistical modelling and computing, validated by Associate Editorship of the R Journal, a leading international statistical computing journal; production

of 7 open-source R packages and 1 Python package used worldwide, having been downloaded more than 240,000 times as of October 2024.

- Leader and expert in statistical software development, and statistical modelling applied to ecology, biology and agriculture, especially involving extensions of generalized linear mixed models, and novel hierarchical models. This has been demonstrated by many invitations to speak at renowned international conferences and events.
- Exceptionally experienced in leading the development of novel statistical methods and publishing in top statistical journals, such as *International Statistical Review*, *Journal of Statistical Software*, *Journal of Computational and Graphical Statistics*, *Journal of Agricultural, Biological, and Environmental Statistics*, and *Bayesian Analysis*.
- Well-versed in leading the experimental design and analysis of data arising from biological studies, and publishing the results in top applied journals, such as *Nature Communications*, *Methods in Ecology and Evolution*, *Journal of Ecology*, *Journal of Pest Science*, and *Science of the Total Environment*.

Research Funding

- Career total of €570K awarded directly, from projects with €1.6M total value.

2025 – 2027 Teagasc-Walsh MSc Award – *Adaptation Potential of Plant Diversity in Intensively Managed Grasslands*. **Role:** PI. **Award:** €48K.

2024 – 2028 IRC Enterprise Partnership Scheme PhD, Ireland – *Assessing variation in biodemographic components with improved statistical tools for fisheries management purposes*. PhD Student: Rachel McInerney. **Role:** Main Supervisor. **Award:** €120K. Enterprise Partner: Ministry for the Environment, Canada.

2023 – 2025 DAFM PSSRC Grant, Ireland – *DETER-BVD: Early Warning Models for Detecting Re-emergence of BVD*. **Role:** PI. **Award:** €350K total, €150K directly to Maynooth University.

2023 – 2026 NIBIO Internal Grant, Norway – *Weeds vs. Crops: The Winner of Climate Change*. **Role:** Co-PI. **Award:** €400K total, €25K directly to Maynooth University.

2022 Local Youth Club Grant Scheme, Ireland – Funding towards the North Kildare Maths Problem Club, to aid the organisation of maths enrichment sessions for secondary school students. **Role:** President. **Award:** €3K.

2022 ISA Short Course Grant, Ireland – Received funding from the Irish Statistical Association to organise in-person events as Chair of the Young-ISA Committee. **Award:** €2.5K.

2021 SPARK Initiative Award, Ireland – *Teaching statistics through music*. MU Teaching & Learning funded my teaching innovation initiative to produce music videos based on parodies of well-known songs to teach statistical concepts to students. **Role:** PI. **Award:** €1K.

2020 – 2024 IRC GOIPG PhD scholarship, Ireland – *Statistical modelling applied to the spatio-temporal dynamics of the Heliothine moth*. PhD Student: Blake McGrane-Corrigan. **Role:** Main Supervisor. **Award:** €110K.

2020 – 2024 SFI Frontiers for the Future, Ireland – *STRIVE: Achieving Sustainable agri-ecosystems ThRough advances In modelling and Visualising the biodiversity and Ecosystem multifunctionality relationship*. **Role:** Team Member. **Award:** €395K total, €2K to me.

2020 – 2023 NIBIO, Norway. **Role:** Associate Scientist. **Award:** €23K.

2020 – 2024 BT Ireland Innovation Centre, Northern Ireland. **Role:** Visiting Researcher. **Award:** €7K.

2020 – 2022 FAPESP, Brazil – *Spatio-temporal dynamics of Lepidoptera communities and their parasitoids at landscape under restoration process.* **Role:** Team Member. **Award:** €33K.

2020 Connolly's Red Mills, Ireland – Received funding to work with data on horse forage quality and mare reproduction. **Role:** Co-PI. **Award:** €3K.

2020 SFI COVID-19 Rapid Response Call, Ireland – *Computational tools for medium-term impact and recovery forecasting from COVID-19*. **Role:** Co-PI. **Award:** €70K.

2019 ISA Short Course Grant, Ireland – Received funding from the Irish Statistical Association to organise in-person events as Vice-Chair of the Young-ISA Committee. **Award:** €2.5K.

2018 Jomakol Ltd., Brazil – Received funding to carry out risk assessment on newly developed genetically

modified organisms. **Role:** PI. **Award:** €4K.

2018 IBS Travel Grant – Awarded the Young Statistician Showcase Prize for the paper *Conditional and marginal models for analysing light interception data*. **Role:** Awardee. **Award:** €3K.

Keynote and Invited Talks (2016 – 2024)

Delivered 70 invited talks at 29 different universities and institutions, in 14 different countries (40 as part of academic seminar series/visiting seminars, and 30 keynote/invited talks at national and international conferences and events)

- *Do Statisticians Have Superpowers?*, presented online to >2,500 students from >70 schools all across Ireland.
- *Finding the Breakpoint in Hematopoietic Stem Cell Production, and Other Statistical Challenges*, delivered at Institut Pasteur, France.
- *Notes and Tricks for Teaching Statistics using Music and Magic*, delivered at the Federal University of Lavras, Brazil, and as a keynote talk for the CETL-MSOR event in Limerick, Ireland.
- *Profiling Television Watching Behaviour Using Bayesian Hierarchical Models*, delivered at Ulster University BTIIC Workshop, UK, and Hamilton Research Day, Ireland.
- *Making High Quality Music Recordings on the Cheap*, delivered at the VOICES Conference 2022: Virtual On- going Interdisciplinary Collaborations on Educating with Song.
- *Teaching Statistics with Music (and Other Strategies)*, delivered at MathsFest 2021, 1st International Meeting in Psychometry and Neurophychological Assessment, at the University of São Paulo, Brazil, and at the University of Galway, Ireland.
- *Statistical Ecology: A Very Brief Introduction*, delivered at the University of São Paulo multiple times and at the Federal University of Paraná, Brazil.
- *Estimating Animal Abundance in Three Difficulty Levels*, delivered at Maynooth University, the 65th meeting of the Brazilian Region of the IBS, the XXIX Chilean Conference in Mathematics (COMCA), the Annual Conference of the Western North American Region of the IBS.
- *Global Short-Term Forecasting of COVID-19 Cases*, delivered at Durham University, the Statistics Thematic Week of the Federal University of Bahia, the BT Ireland Innovation Centre at Ulster University, and the 2nd Operational Research Week, organised by the Brazilian Centre for Operational Research.
- *Image Analysis*, delivered at Dell Data Science Week, online.
- *Topics in Data Science and Artificial Intelligence*, delivered at the Brazilian Centre for Operational Research, the VII Mathematics Week at the Federal University of Acre, and broadcast live through the Estastidados YouTube channel.
- *Statistical Modelling Applied to Entomology*, delivered at the II Workshop on Computational and Mathematical Modelling Applied to Entomology.
- *How do birds compose their music? Modelling ecological and evolutionary patterns in bird song data*, delivered at the Federal University of Uberlândia, Maynooth University, Federal University of Alfenas, University of São Paulo, Loughborough University, University of Limerick, University College Dublin, and University College Cork.
- *Mixed and marginal models for analysing light interception data*, delivered at University of Galway and the XVI School of Regression Models.
- *Models for overdispersed data in Entomology*, delivered at the Norwegian Institute for Bioeconomy Research, Norway.
- *Joint N-Mixture Models to Estimate Animal Abundance*, delivered at Maynooth University, University of Canterbury, the 62nd meeting of the Brazilian Region of the IBS, University of São Paulo, the 9th International Conference of the ERCIM WG on Computational and Methodological Statistics, University of Kent, University of Galway, and broadcast live at the Omega Talks Data Science YoutTube channel.
- *Bivariate residual plots with simulated polygons*, delivered at the R Meetup at the Warsaw University

of Technology, Poland, the University of São Paulo, Brazil, and the University of Galway, Ireland.

- *Statistical modelling of competition and intraguild predation in an integrated pest management scenario*, delivered at the University of Galway and the University of São Paulo.

Contributed Oral Communications in Conferences

2024 Estimating the uncertainty of the L50 in fish: A comparison of 13 methods, *32nd International Biometric Conference, Atlanta, USA,* 10 December 2024

2021 Teaching Statistics Through Musical Parodies, *VOICES Conference 2021: Virtual Ongoing Interdisciplinary Collaborations on Educating with Song*, 26 September 2021

2019 How do birds compose their music? Modelling ecological and evolutionary patterns in bird song data, *2nd Young Statisticians Europe Meeting, Bucharest, Romania,* 1 November 2019

2018 Conditional and marginal models for analysing light interception data, *29th International Biometric Confrence, Barcelona, Spain*, 10 July 2018

2018 Modelling bounded data in plant ecology, *38th Conference on Applied Statistics in Ireland, Galway, Ireland*, 17 May 2018

2017 A diagnostic plot for bivariate models, *37th Conference on Applied Statistics in Ireland, Mullingar, Ireland*, 16 May 2017

2016 N-mixture models applied to zero-inflated insect abundance data, *31st International Workshop on Statistical Modelling, Rennes, France*, 5 July 2016 (awarded the Best Student Oral Presentation prize)

2016 Diagnostic checking for N-mixture models applied to mite abundance data, *36th Conference on Applied Statistics in Ireland, Limerick, Ireland*, 17 May 2016

2015 Assessing goodness-of-fit for accelerated failure rate models: An insect ecology case-study, *30th International Workshop on Statistical Modelling, Linz, Austria*, 7 July 2015

2014 hnp: Half-normal plotting in R, *I Workshop on Experimental Statistics, Piracicaba, Brazil*, 9 September 2014

2014 Half-normal plots and overdispersion in R, *27th International Biometric Conference, Florence, Italy*, 8 July 2014

7 Publications

Summary

- A total of 95 peer-reviewed journal publications (28 as lead/senior author), 73 conference publications (39 as lead/senior author), 5 book chapters, 1 edited book, 1 complete book, 7 R packages, and 1 Python package.
- Citations: 1853, h-index: 18, i10-index: 39 (source: Google Scholar 24 October 2024).
- The software packages have accrued over 240,000 downloads as of October 2024.

Software (lead/senior developer denoted by *)

1 Byrne, L., Vishwakarma, R., **Moral, R.A.**, Brophy, C. (2024) DImodelsMulti: Fit Multivariate Diversity-Interactions Models with Repeated Measures. **R package version 1.0** (`https://CRAN.R-project.org/package=DImodelsMulti`)

* 2 **Moral, R.A.**, Connolly, J., Brophy, C. (2022) DImodels: Diversity-Interactions (DI) Models. **R package version 1.2** (`https://CRAN.R-project.org/package=DImodels`)

* 3 **Moral, R.A.**, Fealy, R. (2019) phenModel: Insect phenology model evaluation based on daily temperatures. **R package version 1.0** (`https://CRAN.R-project.org/package=phenModel`)

* 4 Oliveira, T.P., **Moral, R.A.**, Zocchi, S.S., Demétrio, C.G.B., Hinde, J. (2018) lcc: Longitudinal concordance correlation. **R package version 1.0.3** (`https://CRAN.R-project.org/package=lcc`)

* 5 **Moral, R.A.**, Hinde, J. and Demétrio, C.G.B. (2018) hnp: Half-normal plots with simulation envelopes. **R package version 1.2-6** (https://CRAN.R-project.org/package=hnp)

* 6 **Moral, R.A.**, Hinde, J. and Demétrio, C.G.B. (2018) bivrp: Bivariate residual plots with simulation polygons. **R package version 1.2** (https://CRAN.R-project.org/package=bivrp)

* 7 **Moral, R.A.**, Demétrio, C.G.B. and Hinde, J. (2016) jointNmix: Joint N-mixture models for site-associated species. **R package version 1.0** (https://CRAN.R-project.org/package=jointNmix)

* 8 Palma, G.R., **Moral, R.A.** PyPBP: Outbreak prediction. https://pypbp-documentation.readthedocs.io/en/latest/

Books (lead/senior author/editor denoted by *)

* 1 Cordeiro, G.M. Demétrio, C.G.B., **Moral, R.A.** (2024) Modelos Lineares Generalizados e Aplicações. Blucher. 296 p. *(A textbook on generalized linear models written in Portuguese, targeting the Brazilian statistical community.)*

* 2 **Moral, R.A.**, Godoy, W.A.C. (2024) Modelling Insect Populations in Agricultural Landscapes. Springer, 238 p.

Book Chapters (lead/senior author denoted by *)

* 1 Godoy, W.A.C., **Moral, R.A.** (2024) Introduction. In *Modelling Insect Populations in Agricultural Landscapes* (Eds. **Moral, R.A.** and Godoy, W.A.C.), Springer.

* 2 Godoy, W.A.C., **Moral, R.A.** (2024) Introducing different modelling scenarios to entomologists. In *Modelling Insect Populations in Agricultural Landscapes* (Eds. **Moral, R.A.** and Godoy, W.A.C.), Springer.

* 3 Jayakumari, D., Hinde, J., Einbeck, J., **Moral, R.A.** (2024) Tools for assessing goodness-of-fit in GLMs: Case studies in Entomology. In *Modelling Insect Populations in Agricultural Landscapes* (Eds. **Moral, R.A.** and Godoy, W.A.C.), Springer.

4 Reis, S.F., Costa, C.L.N., Von Zuben, F.J., **Moral, R.A.**, Clemente-Carvalho, R.B.G., Santos, W.L., Vieira, C. (2023) Scale, Concept and Effects of. *Encyclopedia of Biodiversity*.

* 5 Demétrio, C.G.B., Hinde, J., **Moral, R.A.** (2014) Models for overdispersed data in entomology. In *Ecological Modelling Applied to Entomology* (Eds. Ferreira, C.P. and Godoy, W.A.C.), Springer, p. 219–259.

Preprints Under Review (lead/senior author denoted by *)

1 Bueno, I., Palma, G.R., Lara, I.A.R., **Moral, R.A.**, Delalibera Jr., I., Godoy, W.A.C. Understanding Social Immunity in Ants: A Markovian Approach to Collective Cleaning Strategies. https://arxiv.org/abs/2402.05924

2 Hung, R.L. Ng, W.W., Chung, P.K., Li, A.B.S., Luk, T.H.Y., Fong, R., Lee, A., Mok, R., Yung, H., Tse, V., Cheng, R., Schneider, A., Telford, R.L., Dubois, F., Bourayou, E., Milieu Interieur, **Moral, R.A.**, Doisne, J.M., Hasan, M., Leung, G.M., Ni, M.Y., Tse, M., Peiris, M., Di Santo, J., Bruzzone, R., Rouilly, V., Duffy, D. The Healthy Human Global Project-Hong Kong: a community-based cross-sectional study of a healthy Asian population. https://www.medrxiv.org/content/10.1101/2024.09.12.24313504v1

* 3 McGrane-Corrigan, B., Mason, O., **Moral, R.A.** A density-dependent metapopulation model: Extinction, persistence and source-sink dynamics. https://arxiv.org/abs/2405.04505

* 4 Jayakumari, D., Einbeck, J., Hinde, J., Mainguy, J., **Moral, R.A.** A goodness-of-fit diagnostic for count data derived from half-normal plots with a simulated envelope. https://arxiv.org/abs/2405.05121

* 5 Palma, G.R., Mello, R.F., Godoy, W.A.C., Engel, E., Lau, D., Markham, C., **Moral, R.A.** Forecasting insect abundance using time series embedding and machine learning. https://arxiv.org/abs/2312.16196

* 6 Lara, I.A.R., Palma, G.R., Bon, V.J., Reigada, C., **Moral, R.A.** Multi-state models for double transitions associated with parasitism in biological control. https://arxiv.org/abs/2310.20312

* 7 Silva, G.P., **Moral, R.A.** Frame by frame completion probability of an NFL pass. https://arxiv.org/abs/2109.08051v1

* 8 Mimnagh, N., Ferreira, I.E.P., Verdade, L.M., **Moral, R.A.** Counting Animals We Can't See: The Triple Poisson Model for Scarce Vestige Data. https://arxiv.org/abs/2206.05944

Peer Reviewed Journal Publications (lead/senior author denoted by *)

1 Calvey, B., **Moral, R.A.**, Lara, I.A.R., McHugh-Power, J., (*in press*) Do discrepancies between subjective and objective health shift over time in later life? A Markov transition model. *Social Science and Medicine*.

2 Hackett, C., **Moral, R.A.**, Mishra, G., McCarthy, T., Markham, C. (*in press*) An efficient method to simulate wildfire propagation using irregular grids. *Natural Hazards and Earth System Sciences Discussions*.

* 3 Rodrigues, G.M., Ortega, E.M.M., Vila, R., **Moral, R.A.** (*in press*) A new regression model for the analysis of bimodal censored data: A comparison with random survival forests. *Brazilian Journal of Probability and Statistics*.

4 Prado, E.B., Parnell, A.C., **Moral, R.A.**, McJames, N., O'Shea, A., Murphy, K. (*in press*) Accounting for shared covariates in semi-parametric Bayesian Additive Regression Trees. *Annals of Applied Statistics*

5 Grégoire, J.C., Bonte, J., Bourke, A., Cocos, D., Fielding, N., Gohli, J., Inward, D., Klapwijk, M., Nikolov, C., Økland, B., Schroeder, M., Spaans, F., Vakula, J., Blake, M., **Moral, R.A.**, Destefanis, M., Griffin, C., Kunca, A., Murchie, A., Ryan, C., Smith, A., Evans, H.F. (*in press*) Territorial expansion of the European Ips species in the 20th century – a review. *Entomologia Generalis*.

6 Alves, D., **Moral, R.A.**, Jayakumari, D., Dempsey, E., Breslin, C. (*in press*) Factorial optimisation of CoCuFe-LDH/graphene ternary composites as electrocatalysts for water splitting. *ACS Applied Materials & Interfaces*.

* 7 Palma, G.R., Thornberry, C., Commins, S., **Moral, R.A.** (*in press*) Understanding learning from EEG data: Combining machine learning and feature engineering based on hidden Markov models and mixed models. *Neuroinformatics*.

8 Rakes, M., Morais, M.C., Ribeiro, L.P., Palma, G.R., **Moral, R.A.**, Bernardi, D., Grützmacher, A.D. (*in press*) Temperature altering effects of synthetic insecticides on the parasitoid wasp Telenomus podisi for the biocontrol of pentatomids in soybean crops. *Journal of Crop Health*.

9 Conceschi, M.R., Iwanicki, N.S., **Moral, R.A.**, D'Alessandro, C.P., Delalibera Jr., I. *in press*) Improvement of the entomopathogenic fungus Cordyceps javanica efficacy against Diaphorina citri (Hemiptera: Liviidae) under ultraviolet-B radiation and lower relative air humidity provided by oil formulations. *Biocontrol*.

* 10 Araripe, P.P., Lara, I.A.R., Palma, G.R., Cahill, N., **Moral, R.A.** (*in press*) Diagnostics for categorical response models based on quantile residuals and distance measures. *Journal of Applied Statistics*.

* 11 Sercundes, R.K., Molenberghs, G., Verbeke, G., Demétrio, C.G.B., Silva, S.C., **Moral, R.A.** (*in press*) A combined overdispersed longitudinal model for nominal data. *Statistical Modelling*.

12 Bueno, I., Sujimoto, F.R., **Moral, R.A.**, Godoy, W.A.C. (2024) Growth Dynamics of Symbiotic Fungus and How it is Affected By Proportion of Minor Workers (Hymenoptera: Formicidae: *Atta*). *Journal of Insect Behavior*, 37, 82–95.

* 13 Mainguy, J., Bélanger, M., Valiquette, E., Bernatchez, S., L'Italien, L., Millar, R., **Moral, R. A.** (2024) Estimating fish mortality rates from catch curves: A plea for the abandonment of Ricker (1975)'s linear regression method. *Journal of Fish Biology*, 104, 4–10.

* 14 Mainguy, J., Bélanger, M., Ouellet-Cauchon, G., **Moral, R. A.** (2024) Monitoring reproduction in fish: assessing the adequacy of ogives and the predicted uncertainty of their L50 estimates for more reliable biological inferences. *Fisheries Research*, 269, 106863.

* 15 Commins, S., Coutrot, A., Hornberger, M., Spiers, H.J., **Moral, R.A.** (2024) Examining individual learning patterns using generalized linear mixed models. *Behavior Research Methods*, 56, 4930–4945.

* 16 Lesser, L., Patterson, S., Solis, J., **Moral, R.A.** (2024) A Singular Aid: Using Song to Help Teach

Solution Set Cases for Systems of Linear Equations. *Problems, Resources, and Issues in Mathematics Undergraduate Studies*, 34(6), 653–667.

* 17 McGrane-Corrigan, B., Mason, O., **Moral, R.A.** (2024) Inferring Stochastic Group Interactions within Structured Populations via Coupled Autoregression. *Journal of Theoretical Biology*, 584, 111793.

18 Iwanicki, N.S., Castro, T.R., Eilenberg, J., Meyling, N.V., **Moral, R.A.**, Demétrio, C.G.B., Delalibera Jr., I. (2024) Community composition of the entomopathogenic fungal genus *Metarhizium* in soils of tropical and temperate conventional and organic strawberry fields. *Journal of Invertebrate Pathology*, 204, 108079.

19 Deodoro, S.C., **Moral, R.A.**, Fealy, R., McCarthy, T., Fealy, R. (2024) Using the surface scattering mechanism from dual-pol SAR data to predict topsoil particle-size fractions. *Journal of Applied Earth Observation and Geoinformation*, 128, 103742.

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* 10 Jayakumari, D., Lara, I.A.R., **Moral, R.A.** (2024) Predicting from mixed and marginal models when analyzing counts and bounded continuous responses. 32nd International Biometric Conference, Atlanta, USA.

* 11 Jayakumari, D., Einbeck, J., Hinde, J., **Moral, R.A.** (2024) A distance-based statistic for goodness-of-fit assessment. 38th International Workshop on Statistical Modelling, Durham, UK.

* 12 Mimnagh, N., McAloon, C., Parnell, A., Barrett, D., Guelbenzu, M., Carlson, J., Brock, J., McGrath, G., Tratalos, J., **Moral, R.A.** (2024) Anomaly Detection for Predicting BVD Re-Emergence in Irish Cattle Herds Using Imbalanced Data. 44th Conference on Applied Statistics in Ireland – CASI.

* 13 Maciel, A.M.F., Canuto, L.S., Palma, G.R., Godoy, W.A.C., **Moral, R.A.** (2024) Predation dynamics in susceptible and insecticide-resistant ladybirds. 44th Conference on Applied Statistics in Ireland – CASI.

14 Comiskey, H., Finn, J., Malisch, C., **Moral, R.A.**, Suter, M., Black, A.D., Louarn, G., Brophy, C. (2024) What drives changes in plant group proportions over time? An analysis from an international multi-site grassland experiment. 44th Conference on Applied Statistics in Ireland – CASI.

15 Byrne, L., Isbell, F., Finn, J., **Moral, R.A.**, Comiskey, H., Grange, G., Brophy, C. (2024) Diversity-Interactions models for predicting the total response and breakdown by species proportions in biodiversity experiments. 44th Conference on Applied Statistics in Ireland – CASI.

16 McGrane-Corrigan, B., **Moral, R.A.**, Mason, O. (2024) Stability for a discrete-time nonlinear dispersal model. Dynamical Systems Applied to Biology and Natural Sciences, Lisbon, Portugal.

* 17 Rodrigues, G.M., Ortega, E.M.M., Vila, R., **Moral, R.A.** (2024) Análise de sobrevivência utilizando modelos de regressão flexíveis e florestas aleatórias. 68th Meeting of the Brazilian Region of the International Biometric Society, Piracicaba, Brazil.

18 Bueno, I., Palma, G.R., Lara, I.A.R., **Moral, R.A.**, Delalibera Jr., I., Godoy, W.A.C. (2024) Markovian modeling of ant hygiene behavior. 68th Meeting of the Brazilian Region of the International Biometric Society, Piracicaba, Brazil.

19 Calvey, B., Maguire, R., **Moral, R.A.**, McHugh-Power, J. (2024) Depressive symptomatology in older European adults: The role of subjective and objective health discrepancies. Nordic Congress of Gerontology (NKG 2024), Karolinska Institutet, Stockholm, Sweden.

20 Monaghan, C., **Moral, R.A.**, McHugh-Power, J. (2024) Procrastination as a Risk Factor for Poor Health in Older Adults. 38th Annual Conference of the European Health Psychology Society.

* 21 Lara, I.A.R., Palma, G.R., Bon, V.J., Reigada, C., **Moral, R.A.** (2023) Multi-state models for double transitions associated with parasitism in biological control. 37th International Workshop on Statistical Modelling, Dortmund, Germany.

* 22 Palma, G.R., Mello, R.F., Godoy, W.A.C., Engel, E., Lau, D., Markham, C. **Moral, R.A.** (2023)

Forecasting insect abundance using time series embedding and environmental covariates. 37th International Workshop on Statistical Modelling, Dortmund, Germany.

* 23 Jayakumari, D., Einbeck, J., Hinde, J., **Moral, R.A.** (2023) Understanding the role of conditional residual distances from simulated envelopes in half normal plots. 37th International Workshop on Statistical Modelling, Dortmund, Germany.

* 24 McGrane-Corrigan, B., Mason, O., **Moral, R.A.** (2023) Persistence for unimodal population maps via dispersal. 2023 Mathematical Ecology Conference, Pittsburgh-PA.

25 Mimnagh, N., **Moral, R.A.**, Parnell, A., Prado, E.B. (2023) A multivariate N-mixture model applied to estimating the size of foraging bee populations. 43rd Conference on Applied Statistics in Ireland – CASI.

26 Jayakumari, D., **Moral, R.A.**, Einbeck, J., Hinde, J. (2023) Understanding the role of envelope width in half-normal in the context of count data. 43rd Conference on Applied Statistics in Ireland – CASI.

* 27 McGrane-Corrigan, B., Mason, O., **Moral, R.A.** (2023) Inferring animal group interactions. 43rd Conference on Applied Statistics in Ireland – CASI.

* 28 Palma, G.R, Mello, R.F., Godoy, W.A.C., Engel, E., Lau, D., Markham, C., **Moral, R.A.** (2023) A new forecasting tool based on time series embedding. 43rd Conference on Applied Statistics in Ireland – CASI.

* 29 Lara, I.A.R., Paula, L.V.T., Bon, V.J., Reigada, C., **Moral, R.A.** (2023) The gradient test to assess homogeneity of probabilities in discrete-time transition models. 43rd Conference on Applied Statistics in Ireland – CASI.

30 Santos, J.R., Takahashi, T.A., Garcia, A.G., Palma, G.R., **Moral, R.A.**, Parra, J.R.P. (2023) Impacto do ínstar do hospedeiro no parasitismo de *Aleiodes* sp. n. Wesmael (Hymenoptera: Braconidae) em *Spodoptera* spp. Guenée (Lepidoptera: Noctuidae) 17th SICONBIOL and 2nd SLACB, Bahia, Brazil.

31 Santos, J.R., Takahashi, T.A., Garcia, A.G., Palma, G.R., **Moral, R.A.**, Parra, J.R.P. (2023) O alimento do hospedeiro *Spodoptera frugiperda* (J.E. Smith) (Noctuidae) interfere no parasitismo de *Aleiodes* sp. n. Wesmael (Braconidae)? 17th SICONBIOL and 2nd SLACB, Bahia, Brazil.

32 Bueno, I., Palma, G.R., Lara, I.A.R., **Moral, R.A.**, Godoy, W.A.C. (2023) Influence of fungus garden and brood on the cleaning behaviors of leaf-cutting ants exposed to the entomopathogenic fungus *Metarhizium anisopliae*. XXVI Symposium of Myrmecology: An International Ant Meeting.

* 33 Palma, G.R., Aquino, A., Monticelli, P., Verdade, L.M., Markham, C., **Moral, R.A.** (2022) A machine vision system for avian song classification with CNN's. Proceedings of the 24th Irish Machine Vision and Image Processing Conference 2022.

34 Ferreira, I.E.P., Fabiano, D.A.B., **Moral, R.A.**, Mimnagh, N. (2022) Plataforma MAB para avaliar a performance de delineamentos amostrais em estudos de abundância. XLI Congresso Nacional de Matemática Aplicada e Computacional (CNMAC)

35 Lara, I.A.R., **Moral, R.A.**, Taconeli, C.A., Reigada, C., Hinde, J. (2022) Transition Models for Grouped Data Applied to Psyllid Movement. 24th National Symposium of Probability and Statistics (SINAPE), Gramado, Brazil.

36 Sarti, D.A., dos Santos, A.A., **Moral, R.A.**, Parnell, A. (2022) Computational Simulation of Genomics, Phenomics and Environmental Correlated Variables Using Machine Learning. Mendel Genetics Conference 2022, Brno, Switzerland.

37 Sarti, D.A., Prado, E.B., Inglis, A.N., dos Santos, A.A., Hurley, C.B., **Moral, R.A.**, Parnell, A. (2022) Bayesian Additive Regression Trees for Genotype by Environment Interaction Studies. Mendel Genetics Conference 2022, Brno, Switzerland.

* 38 Mimnagh, N., Verdade, L., Ferreira, I.E.P., **Moral, R.A.** (2022) A Triple Poisson Model for Estimating Animal Abundance from Trace Data. 42nd Conference on Applied Statistics in Ireland – CASI.

* 39 Palma, G.R., Aquino, A.C., Monticelli, P.F., Verdade, L.M., Markham, C., **Moral, R.A.** (2022) From Sound to Images: Bird Species Classification Using CNNs. 42nd Conference on Applied Statistics in Ireland – CASI.

* 40 Jayakumari, D., Hinde, J., **Moral, R.A.** (2022) A New Goodness-of-Fit Diagnostic for Count Data

Based on Half-Normal Plots. 42nd Conference on Applied Statistics in Ireland – CASI.

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* 42 McGrane-Corrigan, B., Mason, O., **Moral, R.A.** (2022) Coupled Log-Linear Autoregression and Structured Population Dynamics. 42nd Conference on Applied Statistics in Ireland – CASI.

43 Vishwakarma, R., Byrne, L., Connolly, J., **Moral, R.A.**, Brophy, C. (2022) Estimation of Non-Linear Parameter in Generalised Diversity-Interactions Models Unaffected by Change in Structure of Interaction Terms. 42nd Conference on Applied Statistics in Ireland – CASI.

44 Byrne, L., Vishwakarma, R., Connolly, J., **Moral, R.A.**, Brophy, C. (2022) A New R Package for the Fitting of Multivariate & Repeated Measures Diversity-Interaction Models. 42nd Conference on Applied Statistics in Ireland – CASI.

45 Jones, L., **Moral, R.A.**, Stephens J.C. (2021) A Descriptive Study of the Mineral Content of Conserved Forage fed to Horses in the United Kingdom. Ireland and France. World Academy of Science, Engineering and Technology International Journal of Animal and Veterinary Sciences 15, (12).

46 Hackett, C., **Moral, R.A.**, Markham, C. (2021) Simulating Disease in Periods of Low Mobility Using a Hybrid Diffusion and Compartmental Model Built on Geographic Data. 32nd Irish Signals and Systems Conference (ISSC), 2021, p. 1–6, doi: 10.1109/ISSC52156.2021.9467871

* 47 Brophy, C., Connolly, J., **Moral, R.A.** (2020) DImodels: A new R package for modelling the effects of species and their interactions in biodiversity and ecosystem function research. Annual Meeting of the British Ecological Society.

* 48 Palma, G.R., Markham, C., **Moral, R.A.** (2020) Detecting predation interaction using pretrained CNNs. Proceedings of the 22nd Irish Machine Vision and Image Processing Conference 2020, p. 17–20.

49 Bueno, I., **Moral, R.A.**, Godoy, W.A.C. (2020) Growth dynamics of symbiont fungus and caste structure in leaf-cutting ants (Hymenoptera: Formicidae: *Atta*). Entomology 2020, organised by the Entomological Society of America.

* 50 **Moral, R.A.**, Mendes, M.S., Verdade, L.M. (2019) Modelling evolutionary and ecological musical patterns in Neotropical perching birds. Proceedings of the 34th International Workshop on Statistical Modelling, Guimarães, Portugal.

* 51 **Moral, R.A.**, Bonat, W., Hinde, J., Demétrio, C.G.B., Duarte, M.M (2018) Conditional and marginal models for analysing light interception data. Proceedings of the 29th International Biometric Conference, Barcelona, Spain.

52 Fatoretto, M.B., **Moral, R.A.**, Demétrio, C.G.B. (2018) Statistical analysis of overdispersed fungus germination data. Proceedings of the 29th International Biometric Conference, Barcelona, Spain.

53 Lara, I.A.R., **Moral, R.A.**, Taconeli, C.A., Kuhn, T.M.A., Lopes, J.R.S. (2018) Transition models for grouped longitudinal categorical data applied to entomology. Proceedings of the 29th International Biometric Conference, Barcelona, Spain.

* 54 **Moral, R.A.**, Hinde, J., Bonat, W., Demétrio, C.G.B. (2018) Modelling bounded data in plant ecology. Proceedings of the 38th Conference on Applied Statisics in Ireland, Galway, Ireland, p. 77–78.

55 Fatoretto, M.B., **Moral, R.A.**, Demétrio, C.G.B., Rojas, V.A., Delalibera Jr., I. (2017) Análise de resistência de isolados utilizando modelos lineares generalizados mistos. Proceedings of the 62nd Annual Meeting of the Brazilian Region of the IBS, Lavras, Brazil, p. 254.

56 Thomas, G., Nakamura, L.R., **Moral, R.A.**, Demétrio, C.G.B. (2017) Modelling count data with excess of zeros and overdispersion using GAMLSS. Proceedings of the 62nd Annual Meeting of the Brazilian Region of the IBS, Lavras, Brazil, p. 263.

* 57 **Moral, R.A.**, Hinde, J., Demétrio, C.G.B. (2017) Bivariate residual plots with simulation polygons. Proceedings of the 32nd International Workshop on Statistical Modelling, Groningen, The Netherlands, vol. II, p. 67–70.

* 58 **Moral, R.A.**, Demétrio, C.G.B., Hinde, J. (2017) A diagnostic plot for bivariate models. Proceedings

of the 37th Conference on Applied Statisics in Ireland, Mullingar, Ireland, p. 42–43.

* 59 **Moral, R.A.**, Hinde, J., Demétrio, C.G.B., Reigada, C. and Godoy, W.A.C. (2016) N-mixture models applied to zero-inflated insect abundance data. Proceedings of the 31st International Workshop on Statistical Modelling, Rennes, France, vol. I, p. 233–237.

* 60 **Moral, R.A.**, Hinde, J. and Demétrio, C.G.B. (2016) Diagnostic checking for N-mixture models applied to mite abundance data. Proceedings of the 36th Conference on Applied Statistics in Ireland, Limerick, Ireland, p. 30–31.

* 61 **Moral, R.A.**, Demétrio, C.G.B. and Hinde, J. (2016) Joint models for repeated counts of predators and prey. Proceedings of the 9th International Conference of the ERCIM WG on Computational and Methodological Statistics, Seville, Spain.

* 62 **Moral, R.A.**, Hinde, J., Demétrio, C.G.B. and Ortega, E.M.M. (2015) Assessing goodness-of-fit for accelerated failure rate models: An insect ecology case-study. Proceedings of the 30th International Workshop on Statistical Modelling, Linz, Austria, p. 308–313.

63 Oliveira, T.P., **Moral, R.A.**, Hinde. J., Demétrio, C.G.B., Zocchi, S.S., Zanardo, A.B.R. and Delalibera Jr., I (2015) Generalized linear mixed models applied to overdispersed proportion data in a fungal occurrence study. Proceedings of the 30th International Workshop on Statistical Modelling, Linz, Austria, p. 203 – 206.

64 Pádua, C.S., Fatoretto, M.B., Menarin, V., **Moral, R.A.**, Demétrio, C.G.B. and Rojas, V.M.A. (2015) Generalized linear mixed models: an application to fungi data. Proceedings of the 60th World Statistics Congress, Rio de Janeiro, Brazil.

* 65 **Moral, R.A.**, Hinde, J. and Demétrio, C.G.B. (2014) Half-normal plots and overdispersion in R. Proceedings of the 27th International Biometric Conference, Florence, Italy.

* 66 **Moral, R.A.**, Alderete, M.C., Demétrio, C.G.B. and Orgeira, J. (2014) Zero-inflated models applied to Antarctic bird abundance data. Proceedings of the I Workshop on Experimental Statistics, Piracicaba, Brazil.

* 67 **Moral, R.A.**, Godoy, W.A.C., Hinde, J. and Demétrio, C.G.B. (2013) Parasitism affects predator choice in agroecosystems. Proceedings of the 58nd Annual Meeting of the Brazilian Region of the IBS, Campina Grande, Brazil.

* 68 **Moral, R.A.**, Godoy, W.A.C., Hinde, J. and Demétrio, C.G.B. (2013) Modelling competition between overlapping niche predators. Proceedings of the 33rd Conference on Applied Statistics in Ireland, Clane, Ireland, p. 60.

* 69 Godoy, W.A.C., Battel, A.P.M.B. and **Moral, R.A.** (2012) Interaction mathematical model and applications on integrated pest management. Proceedings of the British Ecological Society Annual Meeting, Birmingham, UK.

* 70 **Moral, R.A.**, Battel, A.P.M.B., Neves, J.A., Lopes, E.N. and Godoy, W.A.C. (2012) Dynamics of hosts and parasitoids with integrated pest management policy: theory and experimentation. Proceedings of Models in Population Dynamics and Ecology 12, Santa Maria, Brazil.

71 Silveira, T.A., Marchini, L.C., Ferreira, I.E.P., **Moral, R.A.** and Godoy, W.A.C. (2012) Pollen as environmental indicator: a foraging activity model for *Apis mellifera* based on multi-agents. Proceedings of the 8th International Conference on Ecological Informatics, Brasília, Brazil.

* 72 **Moral, R.A.**, Carrara, J.A., Godoy, W.A.C. and Ferreira, I.E.P. (2011) Demography affects migration dynamics of blowflies. Proceedings of the 1st International Conference on Spatial Ecology and Conservation, Birmingham, UK.

73 Ferreira, I.E.P., **Moral, R.A.** and Ferreira, C.P. (2011) Modelling fungus dispersion scenarios using cellular automata. Proceedings of the 1st International Conference on Spatial Ecology and Conservation, Birmingham, UK.

8 Teaching

Teaching Philosophy

My teaching practice is student-centred, and focussed on helping students achieve their objectives and maximise their potential. I always strive to bring real world examples and applications to my lectures, and encourage student interaction so that we can all develop our knowledge and skills continuously within a non-judgmental environment. Especially in the fields of Statistics and Data Science, which require specialist knowledge in Mathematics, it is extremely important to relate the taught content to the real world. This is because many students will not specialise in Statistics, but they will make use of the techniques I teach professionally and in their personal lives.

Lecturing Experience

- I have accumulated over 17 years of teaching experience overall, and 10 years experience teaching in 3rd level (as a tutor and lecturer).
- Delivered and assessed 28 modules at Maynooth University.
- Created and delivered the module LCE5873-1 Statistical Machine Learning, as a visiting lecturer at the University of São Paulo, Brazil, associated to the postgraduate programme in Statistics and Agricultural Experimentation.
- Developed the modules DS151 and DS152 (Introduction to Data Science I and II), and ST306 (Time Series), and revamped the modules ST221 (Introduction to Statistics) and ST203 (R for Data Science and Statistics) to better suit the new denominated-entry BSc Data Science programme at Maynooth University.
- Developed and taught 28 short courses at 10 different institutions, including Maynooth University, University of Galway, University College Dublin, University of São Paulo, Institut Pasteur, Laimburg Research Centre, and the Norwegian Institute for Bioeconomy Research.

Teaching Evaluations

Average scores from 2018 – 2024 ($n = 938$ students): Preparation: 3.90/4.00, Ability to make the content interesting: 3.87/4.00, Helpfulness: 3.87/4.00, Clear presentation: 3.73/4.00, Student stimulation and engagement: 3.71/4.00.

The student feedback I receive is consistently overwhelmingly positive. Below I present a selection of quotes from a range of modules:

- "Thanks Rafael for teaching us in such a wonderful way that I started kind of **applying stats to every aspect of my life**."
- "Thanks for everything Rafael, you were by far one of the **best lecturers I've ever had**!"
- "I just wanted to say thank you so much Rafael. I really appreciate all the time and effort you have put into all the extra resources for us, **you really went over and beyond for us** and I wanted you to know that it has helped so much! I really struggle with maths and actually for once **found maths enjoyable** and not something that is scary or unachievable."
- "I definitely think this module has made me a lot more interested in statistics as a subject, to the point where I'm **considering picking it up next year as part of my degree**. Thank you Rafael!"
- "Rafael is the **best lecturer I've had** and it's not even close."
- "**Your effort was unlike any other** to help explain even in terms of videos and songs."
- "Rafael was very approachable and was always happy to answer any questions without judging. **This is why everybody likes him** :) Thank you, Rafael! You rock!"
- "Rafael is **extremely good at explaining concepts** and keeping the material interesting."

9 Supervision

PhD supervision

2024 – pres. Rachel McInerney, *title: Assessing variation in biodemographic components with improved statistical tools for fisheries management purposes,* funded by the IRC Enterprise Partnership Scheme (proc. no. EPSPG/2024/48); Maynooth University, Statistics Programme. Enterprise Partner: Ministry for the Environment, Canada.

2021 – pres. Luciano Ribeiro Galvão, *title: TBC,* University of São Paulo, Statistics and Agricultural Experimentation Programme.

2021 – pres. Gabriel Rodrigues Palma, *title: TBC,* co-supervisor: Prof. Charles Markham, funded by SFI (Centre for Research Training in Foundations of Data Science); Maynooth University, Statistics Programme

2020 – 2024 Darshana Jayakumari, *title: Topics in Model Evaluation and Comparison,* funded by SFI (Centre for Research Training in Foundations of Data Science); Maynooth University, Foundations in Data Science Programme

2020 – 2024 Blake McGrane-Corrigan, *title: Coupled Models of Structured Ecological Systems: Patch Dynamics, Population Demography and Stochastic Interactions,* co-supervisor: Prof. Oliver Mason, funded by the IRC (proc. no. GOIPG/2020/939); Maynooth University, Statistics Programme (BMC was also offered a John Hume Award, 1st place)

2019 – 2023 Niamh Mimnagh, *title: Novel Developments in Bayesian Modelling Applied to Estimating Abundance in Animal Communities,* funded by SFI (Centre for Research Training in Foundations of Data Science); Maynooth University, Foundations in Data Science Programme (NM was also offered a John Hume Award for Women in STEM, 1st place)

PhD co-supervision

2023 – pres. Ida Dybing, *primary supervisor: Dr Zahra Bitarafan, title: TBC,* funded by the Norwegian Research Council, NIBIO, Norway.

2022 – pres. Cormac Monaghan, *primary supervisor: Prof. Joanna McHugh-Power, title: TBC,* funded by SFI (Centre for Research Training in Foundations of Data Science); Maynooth University, Foundations in Data Science Programme.

2022 – pres. Sandra Cristina Deodoro, *primary supervisor: Prof. Rowan Fealy, title: Estimating Soil Particle-Size Fractions and Predicting Soil Texture from Microwave Remote Sensing Techniques with Applications in Ireland,* funded by Maynooth University, John & Pat Hume Award.

2021 – pres. Conor Hackett, *primary supervisor: Prof. Charles Markham, title: TBD,* funded by SFI (Centre for Research Training in Foundations of Data Science); Maynooth University, Foundations in Data Science Programme (CH was also offered a John Hume Award).

2021 – pres. Guilherme Cavicchioli da Silva, *primary supervisor: Prof. Luciano Verdade, title: The Effects of Sampling Effort in the Phylogenetic and Functional Diversity of Birds from Passive Acoustic Monitoring,* funded by Coordination of Superior Level Staff Improvement (CAPES, Brazil), University of São Paulo, Applied Ecology Programme.

2020 – pres. Jéssica Abonizio Gouvea, *primary supervisor: Prof. Luciano Verdade, title: Determining Giant Anteater Demography and Population Genetics from Vestiges,* funded by Coordination of Superior Level Staff Improvement (CAPES, Brazil), University of São Paulo, Applied Ecology Programme.

2019 – 2023 Alessandra Lemos, *primary supervisor: Prof. Andrew Parnell, title: Latent Tensor Bayesian Models for Estimating Complex Interactions in Plant Variety Testing,* funded by SFI; Maynooth University

2019 – 2022 Patricia Peres Araripe, *primary supervisor: Prof. Idemauro A.R. de Lara, title: Residual and diagnostic analyses for models with polytomous response variables,* funded by PrInt – USP/CAPES (Brazil); University of São Paulo, Statistics and Agricultural Experimentation Programme

2018 – 2022 Estevão Prado, *primary supervisor: Prof. Andrew Parnell, title: Generalisations on Bayesian additive regression trees,* funded by SFI; Maynooth University

2016 – 2020 Maira Blumer Fatoretto, *primary supervisor: Prof. Clarice G.B. Demétrio, title: Hierarchical models applied to the natural sciences,* funded by CNPq, proc. no. 141117/2018-4; University of São Paulo, Statistics and Agricultural Experimentation Programme

MSc Supervision – MSc by Research

2020 – 2022 Gustavo Pompeu da Silva, *title: Frame by Frame Completion Probability of an NFL Pass;* University of São Paulo, Statistics and Agricultural Experimentation Programme, funded by CAPES proc. no.

88887.483407/2020-00.

2019 – 2024 Cathal Flood, *title: Forecasting the Emergence of the Pine Weevil in Present and Future Climates;* Maynooth University, joint supervision with Dr Christine Griffin and Dr Rowan Fealy, funded by DAFM.

MSc Supervision – Taught MSc Summer Project

2024 Bimal Oommen John, *title: TBC*; Maynooth University, Data Science & Analytics programme

2024 Longxiang Wu, *title: TBC*; Maynooth University, Data Science & Analytics programme

2023 Ben Butler, *title: From Data to Glory: Exploring Predictive Factors for Advancement in the FIFA World Cup through Statistical Analysis;* Maynooth University, Data Science & Analytics programme

2023 Abhishek Kellaka, *title: Machine Learning Based Credit Risk Assessment: A Focus on Transparency and Decision Making Through Model Interpretation;* Maynooth University, Data Science & Analytics programme

2023 Giridharan Sridharan, *title: Anomaly detection in financial transactions using unsupervised methods;* Maynooth University, Data Science & Analytics programme

2022 Vincent Tennanty, *title: The Effect of Lameness on Milk Yield & Quality and a Genome Wide Association Study to Identify new Genetic Markers for Lameness in Dairy Cows;* Maynooth University, Data Science & Analytics programme

2022 Srishti Mishra, *title: Time series modelling of Serengeti bird species abundance;* Maynooth University, Data Science & Analytics programme

2022 Jinsee Payyeri, *title: Time series modelling applied to greenhouse gas emissions from New York City;* Maynooth University, Data Science & Analytics programme

2021 Adam Mills, *title: Bayesian modelling of wildfire burn severity;* Maynooth University, Data Science & Analytics programme

2021 Chenlin Liu, *title: Forecasting the number of daily COVID-19 infections in the UK;* Maynooth University, Data Science & Analytics programme

2020 Amol Nanaware, *title: Brazilian vegetation type prediction using a Shiny dashboard;* Maynooth University, Data Science & Analytics programme

2020 John Dunne, *title: Classification of Brazilian biomes;* Maynooth University, Data Science & Analytics programme

2020 Subhranshu Mohanty, *title: Classification of bat species using gradient boosting;* Maynooth University, Data Science & Analytics programme

2020 Japneet Singh, *title: Hierarchical identification of bats from call acoustics using deep neural networks;* Maynooth University, Data Science & Analytics programme

2020 Sathishkumar Ravichandran, *title: A Shiny app to classify bats based on acoustic data;* Maynooth University, Data Science & Analytics programme

2020 Shubham Kamitkar, *title: Mexican bat species classification using supervised statistical machine learning techniques;* Maynooth University, Data Science & Analytics programme

2020 Anurag Chaturvedi, *title: Clustering methods and comparison with phylogeny of bat species;* Maynooth University, Data Science & Analytics programme

2019 Paula McMahon, *title: Behavioural analytics and prediction with eCommerce transactional data;* Maynooth University, Data Science & Analytics programme

2019 Ganesh Sharma, *title: Statistical modelling of insect resistance management data;* Maynooth University, Data Science & Analytics programme

2018 Niamh Mimnagh, *title: Statistical modelling of the population size of mites in contrasting ecosystems;* Maynooth University, Data Science & Analytics programme

2018 Mohammad Sabir Abdul Bari Shaikh, *title: `DecisionTree`: a Shiny app for classification and regression trees;* Maynooth University, Data Science & Analytics programme

Undergraduate Project Supervision

2023 Rachel McInerney, Generalized Linear Mixed Models Applied to Ecological Data on Wildlife Monitoring, Summer Internship in the Dept of Mathematics and Statistics, Maynooth University, €1500.

2019 Gabriel Rodrigues Palma, funded by the University of São Paulo Innovation Agency (Agência USP de Inovação), 3 months, Maynooth University, €4000.

2019 Stephen Nolan, *joint supervision with Prof Joe Timoney, title: Processing bird song files*, funded by the SPUR programme, 2 months, Maynooth University

2014 – 2015 Angélica Borges de Sousa, *joint supervision of Scientific Initiation project with prof. Clarice G.B. Demétrio, title: Population dynamics models applied to insect ecology*, funded by CNPq, proc. no. 2014-3091, 12 months, University of São Paulo, Brazil

10 Outreach

I firmly believe outreach activities are key to establishing a successful and internationally recognised statistics group, as well as to bringing more prospective students, staff and funding.

- Produced 24 music videos posted to YouTube and Twitter, aimed at teaching Statistics to secondary school students, undergraduates and postgraduates, which have accumulated **over 200,000 views** to date.
- Participated in the Science Communication Collective organised by the Department of Health, in collaboration with the CMO Dr Tony Holohan, and produced videos aimed at young adults in Ireland to inform of risk during the pandemic. Videos accumulated **over 1 million views** to date.
- My innovative approaches have reached the level of national and international impact. I have been featured by newspapers such as the Irish Times and Irish Independent, as well as international societies such as the Consortium for the Advancement of Undergraduate Statistics Education. I have also received awards from the National Forum for the Enhancement of Teaching and Learning and the Union of Students in Ireland.
- Pioneered the series of STEM talks delivered to secondary school students with the talk "Do Statisticians Have Superpowers?", attended by more than 2,500 students from over 70 schools across 17 counties in the Republic of Ireland.
- Heavily involved in outreach events and activities, such as Open Days and Orientation Talks, promoting the Statistics, Data Science, and omnibus Science programmes.
- Organised several webinar series in Statistics, Data Science and Theoretical and Statistical Ecology.
- Organised online poster conferences and competitions, and live events through the Young-ISA.
- Organised maths enrichment classes to train secondary school students to sit the Irish Mathematics Olympiad.
- Represented Ireland in Romania at the 2nd Young Statisticians Europe Meeting, organised by the Federation of European National Statistical Societies.

11 Administration

Positions in Wider Community

2024 – 2027 Chair of the Education Committee of the International Biometric Society (IBS).

2024 Member of the organising committee of the LegacyNet Conference, aimed at training researchers involved in the LegacyNet consortium of 32 experiments spread across 16 different countries.

2022 – 2023 Member of the Education Committee of the International Biometric Society (IBS).

2022 Chair of the organising committee of the 2nd Young-ISA Meeting: Communication & Reproducibility

in Statistics (Funding obtained from the ISA: €2,500, 56 participants).

2021 – pres. Founder and Leader of the Theoretical and Statistical Ecology Research Group. (https://rafamoral.github.io/tse)

2021 – pres. Associate Editor for the Brazilian Journal of Probability and Statistics.

2021 – 2023 Chair of the Young Statisticians' Section of the Irish Statistical Association.

2021 – 2023 President of the North Kildare Maths Problem Club.

2021 Member of the Science Communication Collective from the Department of Health of the Government of Ireland.

2021 Member of the Scientific Committee of the IEEE Smart Worlds Conference.

2021 Member of the Scientific Committee of the 65th Meeting of the Brazilian Region of the IBS.

2021 Member of the organising committee of the 41st Conference on Applied Statistics in Ireland - CASI 2021 (354 participants).

2020 – pres. Associate Editor for the R Journal.

2020 – pres. Associate Scientist at the Norwegian Institute of Bioeconomy Research, Norway.

2020 – pres. Visiting Researcher at the BT Ireland Innovation Centre, Northern Ireland.

2020 – 2021 Vice-President of the North Kildare Maths Problem Club.

2020 Member of the organising committee of the Young-ISA Twitter Poster Conference (Sponsored by Zurich Ireland Insurance Group Ltd.)

2019 Vice-chair of the Young Statisticians' Section of the Irish Statistical Association.

2019 Chair of the organising committee of the Inaugural Young-ISA Meeting: Statistics in Academia and Industry (Funding obtained from the ISA: €2,500, 70 participants).

2019 Chair of the organising committee of the Workshop on Ecological Data Analysis (Maynooth University, 27 participants)

Roles at Maynooth University

2023 – pres. Chair of the Biomedical & Life Sciences Research Ethics Committee.

2022 – pres. Member of the Public Relations Committee of the Department of Mathematics and Statistics.

2021 – pres. Member of the STEM Promotion Committee.

2021 – pres. Member of the Finance Committee of the Department of Mathematics and Statistics.

2020 – 2024 Coordinator of the Higher Diploma in Data Analytics.

2020 Departmental Final Year Statistics Coordinator.

2019 – pres. Lead statistician of the Biomedical & Life Sciences Research Ethics Committee.

2018 – 2019 Organiser of the Colloquium Series in Mathematics and Statistics.

12 Professional Consultancy

Risk assessment for commercial production of genetically modified organisms

2012 Amyris Biotechnologies, *Saccharomyces cerevisae* strain, BRL 5,000.00

2013 – 2017 Solazyme/TerraVia, 5 strains of *Prototheca moriformis*, BRL 28,000.00

2015 Mascoma/Lallemand, *Saccharomyces cerevisae* strain, BRL 6,000.00

2016 Lesaffre, *Saccharomyces cerevisae* strain, BRL 6,000.00

2018 Evonik Industries, undisclosed yeast strain, EUR 3,944.00

Analysis of nutritional content in horse feed

2020 Connolly's Red Mills, EUR 1,036.00 (PIs: Dr Rafael Moral and Prof John Stephens, MU)

Analysis of mare reproduction data

2020 Connolly's Red Mills, EUR 1,688.00 (PIs: Dr Rafael Moral and Prof John Stephens, MU)