# Adriel Ong

*C*urriculum Vitae


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## Consultancy Work

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|---|---|
| *WIP* | ***Intelligent Transportation System Consulting*** |
| | Gave consulting, traffic study, and seminar for traffic and transport economics in a city with more than one million population in the Philippines. Study postponed because of pandemic. |
| *2023 / 02* | ***Survey Response Recommendation System*** |
| | Estimated a Gaussian Mixture Model to perform overlapping cluster analysis on survey response data. Used Natural Language Processing for freeform text responses. Built an application using Avalonia UI and C# for . Implemented a flow to update the model periodically. |
| *2023 / 01* | ***Technical Indicator Hyperparameter Optimization*** |
| | Used evolutionary programming and LightGBM to find optimal parameters for technical indicators. Project used Wasserstein GAN to returns and drawdown from technical indicator parameters. |
| *2022 / 12* | ***Marawi City Study*** |
| | Commissioned by a government agency. Performed barangay population projection, land use projection, traffic modeling, and social services demand projection. Study used inverse distance weighting to interpolate missing data, then used spatiotemporal Random Forest for projections. Bayesian age-cohort-population modeling also performed, but results were not used. |
| *2022 / 11* | ***Political Social Network Analysis*** |
| | Estimated degree centrality, assortativity, proximity prestige, and analyzed hubs and authorities in a social network of political organizations using the NetworkX package in Python. |
| *2022 / 10* | ***Larval Toxicology Randomized Control Trial*** |
| | Analyzed data collected from two Randomized Control Trials studying the effect of a pesticide and a drug cocktail on two samples of insect larvae. |
| *2022 / 10* | ***Survival analysis for Osteosarcoma*** |
| | Performed survival analysis using Competing Risk regression and Cox Proportional Hazards regression on Osteosarcoma data. Estimated Farrell's C index to determine which surgical staging classification to use. |
| *2022 / 06–10* | ***Degree Centrality and Prestige Social Network Analysis*** |
| | Gave consulting on study design and estimated graph metrics. Study involved estimating degree centrality and degree prestige, and statistical modeling using these metrics. |
| *2022 / 09* | ***Sustainability Reporting and Corporate Financial Performance*** |
| | Performed hierarchical model analysis on sustainability indicators' impact on corporate financial performance with random slopes and intercepts. |
| *2022 / 09* | ***COVID Vaccine and Mutation Interaction Study*** |
| | Performed an interaction study on the effects of each COVID vaccine on the number of mutations in each COVID variant. Found that mRNA vaccines have significantly more mutations than competing vaccine. |
| *2022 / 09* | ***IMU Accelerometer Signal Processing*** |
| | Performed signal processing in Python on linear acceleration data using Butterworth Filter and Fast Fourier Transform to obtain tremor data. Successfully decomposed and denoised data to see tremor levels. |
| *2022 / 08* | ***Spatiotemporal Data Analysis*** |
| | Analyzed spatiotemporal data using geoR and STARMA packages in R. Achieved good accuracy in test data. |
| *2022 / 08* | ***Medical Device Equivalence Testing*** |
| | Gave statistical consulting on sample size estimation for novel medical device equivalence testing. |
| *2022 / 05* | ***Sustainability Reporting Consulting*** |
| | Gave statistical consulting on sustainability indicators' impact on corporate financial performance. |
| *2022 / 05* | ***Dividend Payout Statistical Modeling*** |
| | Performed panel data analysis on factors affecting dividend payout policies among companies in ASEAN, comparing pooling, fixed effects, and random effects models. Also performed panel variable coefficient modelling for each country. |
| *2021 / 11* | ***Population and Chattel Slavery Prevalence*** |
| | Gave statistical consulting and performed analysis of population impact on chattel slavery prevelance, along with temporal-spatial effects. |
| *2021 / 10* | ***Illiquid Assets Pricing Model*** |

Implemented a Geometric Brownian Motion model in Python that estimated illiquid asset volatility and correlation with liquid asset, then performed price simulation using estimated results. Model came from Ang, Papanikolaou, and Westerfield (2014), and required applying Ito's Lemma to obtain a formula for use with Monte Carlo Integration. Said asset was cryptocurrency with token lockups, requiring illiquid asset analysis. Returns distribution also had fat-tailedness, requiring use of Laplacian Distribution in Monte Carlo. Model obtained 97% accuracy in backtesting.

*2021 / 10* | *Forecasting Weekly Sales Volumes Transactional Data*

Implemented a Multilayer Perceptron for forecasting product sales volumes using transactional cashier data, and performed correlation analysis for first-differenced sales and pricing data. Discovered that sales for different product groups would rise by more than 180% for all groups but one, both target countries, and one target channel, and that two goods violated the Law of Demand.

*2021 / 09* | *Prey Processing Bout Longitudinal Analysis*

Performed longitudinal data analysis on shark prey-processing behavior using standard econometric tools for time series and panel data.

*2021 / 08* | *State Space Model using Kalman Filter for Macroeconomic Forecasting*

Performed a novel implementation for Kalman filter for credit and macroeconomic data using Python. This implementation was required for analysis of panel data with exogenous control variables with Kalman filtering.

*2021 / 07* | *Bayesian Distance Clustering in R*

Implemented a Bayesian Distance Clustering algorithm in R. This implementation required novel code for Hamiltonian Monte Carlo with tensor objects.

*2021 / 06* | *Traffic forecasting in Software Defined Networking using Deep Learning*

Performed classification analysis to forecast traffic flowing to Network Protocols.

*2021 / 05* | *Classification Model for Shark Behavior*

Performed classification modeling on longitudinal data for shark behavior, with corrections for autocorrelation and multicollinearity.

*2021 / 04* | *Uncorrelated Capital Asset Pricing Estimation for Multiasset Portfolio*

Estimated a Capital Asset Pricing Model for a panel of assets with uncorrelated alpha and beta.

*2020 / 10* | *Cafe Aghora Sales Consultancy*

Gave consultation for a data science team which analyzed optimal days for sales from Cafe Aghora in Bacolod City.

*2020 / 10* | *Sta Rita Orphanage Data Engineering*

Gave consultation for a data science team which performed data engineering for Sta Rita Orphanage in Parañaque City.

*2020 / 07* | *Alabel Municipal Hall Feasibility Study*

Prepared a feasibility study on the new municipal hall of Alabel, Sarangani.

*2020 / 05* | *Outlook on Feeds and Grain Market*

Prepared an outlook analysis on the domestic markets for feeds and grains.

*2020 / 01* | *Hotel Feasibility Study*

Estimated projected profits using quantitative methods on visitor, revenue, and geospatial data.

*2020 / 01* | *Employee Turnover Analysis*

Crafted a survey to record key variables and performed statistical analysis to determine which variables affected the probability of turnover.

*2019 / 11* | *Firm Profitability Analysis*

Obtained company time-series data on employee productivity and performed market research to determine their effects on the company's profits.

# Working Papers

## Empirical

*2022 / 02* | *Expansionary Credit, Easy Money, and Boom-bust Cycles, 1868-1970*

MSR Working Paper Series | Analyzed long-run and causal effects of expansionary credit on American business cycles.

*2021 / 05* | *Developing a Provincial Destination Choice Model of the Philippines*

MSR Working Paper Series | Developed a model assigning weights to factors affecting domestic traveller choice of provincial destination in the Philippines.

*2021 / 05* | *Historical Climate Factors and Rice Prices in the Philippines*

MSR Working Paper Series | A paper analyzing how rice prices in the Philippines have responded to historical climate factors.

# Case Studies

## Transportation

*2019/03* | *Route Assignment for Travel between Metro Manila Central Business Districts*
Determined optimal route assignments for travelers between Makati, Ortigas, and Bonifacio Global City using linear programming methods.

*2018/12* | *Mode Choice Analysis of New York City*
Undertook mode choice analysis of passenger behavior in New York City using 2017 data.

*2018/08* | *Estimation of the Lane–Mile Elasticity of Metro Manila Traffic*
Estimated the magnitude of effect of road size and expansions on traffic in Metro Manila in the Philippines using linear regression methods.

## Miscellaneous

*2019/03* | *Is the Filipino Worker Ready for Industry 4.0? An Empirical Analysis*
Performed classification analysis of factors predisposing the Filipino labor market to choices of occupation.

# Courses Taught

## M&S Research Hub

*Applied Econometrics*
A program for training in Econometric Theory.

*Progmetrics*
A program for training in practical Econometrics using R and Python.

*Introductory Machine Learning Theory and Practice*
Intensive training on the fundamentals of Machine Learning for econometric modeling and data analysis using Julia.

*Bayesian Inference for Data Science and Research*
Introductory training for Bayesian inference theory and applications to statistical inference and regression analysis.

*Theoretical Foundations of CGE Modelling*
Training for Computable General Equilibrium models with GAMS.
*Recommended course by the GAMS Institute.*

*Bayesian SVAR and Regime Switching Models Using R and Stata*
Special training for the theory and practice of Structural Vector Autoregressions, Bayesian Inference, and Regime Switching Models with R and Stata.

# Positions Held

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| 2020/03–Present | Chief Statistician, DATSTAT Consulting<br>Balibago, Angeles, Philippines |
| 2020/11–2022/02 | Academic Council, M&S Research Hub<br>Kassel, Germany |
| 2019/08–Present | Chief Analytics Officer, ACOng Consulting Inc<br>Makati, Philippines |

# Software Development

*2021/11* | *MultiDistBrownianMotion*
Developed a Python Package for Brownian Motion Simulations for Liquid and Illiquid Financial Assets, with options for non-Normal Probability Distributions.

*2021/09* | *PanelKalmanFilter*
Developed a Python Package for Kalman Filtering of Panel Data.

## Seminars Attended

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| *2021/03* | *The Linear Probability Model and Its Discontents*<br>by Andrew Pua |
| *2020/12* | *Automation, Tasks, and Wages*<br>by Daron Acemoglu |

## Formation

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| 2022/06 | Postgraduate Certificate in Mathematics<br>Open University, United Kingdom |
| 2019/12 | Bachelor of Science in Applied Economics, Major in Industrial Economics<br>De La Salle University, Philippines<br>Thesis: "Developing a Provincial Destination Choice Model of the Philippines"<br>Advisor: Lawrence B. Dacuycuy<br>cGPA: 3.193/4.0 |

## Technical Skills

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| Programming Languages: | Python, R, Julia, C#, SQL, LaTeX, HTML, CSS |
| Python Libraries: | Statsmodels, PyMC3, Sckit-Learn, Theano |
| C# Frameworks: | Avalonia UI |
| NoSQL Databases: | ScyllaDB |
| Operating Systems Used: | Ubuntu, Manjaro, ArtixLinux |
| Other Software Used: | SageMath, Stata, GAMS, OnlyOffice |

## Interests and Activities

Languages known: English, Tagalog, Kapampangan, Mandarin

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| Concentrations: | Mathematics, Statistics, Economics |
| Main Fields: | Probability Theory, Stochastic Processes, Reg<br>Research, Decision Theory |
| Hobbies: | Aristotelian Philosophy, Medieval Social and E |
| YouTube Channel: | ViatorInTerra |

## References


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|---|---|
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| Justin Raymond Eloriaga | eloriagajs@bsp.gov.ph |
| Sherif Maher Hassan | hassan@ms-researchhub.com |