Isabelle Tingzon

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EXPERIENCE

United Nations Children's Fund (UNICEF) | Giga — **Barcelona, ESP**
Data Science Consultant — Oct 2023 - Present

- Lead our AI-enabled school mapping initiative, utilizing geospatial data analysis, machine learning (ML), and high-resolution Maxar satellite images to advance SDG 4: Quality Education under Giga, a global initiative by UNICEF-ITU to connect every school to the internet by 2030. **Collaborators**: European Space Agency (ESA).
- Generated large-scale, nationwide maps of school locations across African countries using computer vision models trained in high-performance computing (HPC) environments; presented the results on an interactive web map using Mapbox, allowing end-users in governments to ground-validate the model predictions.
- Effectively communicated complex technical concepts to government partners, ministries of education, and UNICEF country offices through clear presentations and comprehensive technical reports.
- **Supervisors**: Dr. Do-Hyung Kim and Dr. Ivan Dotu Rodriguez

The World Bank | Global Facility for Disaster Reduction and Recovery (GFDRR) — **Washington DC, USA**
Disaster and Climate Risk Data Fellow | Consultant — Feb 2023 - Present

- **Project**: Digital Earth for Resilient Housing and Infrastructure in the Caribbean
  Led the development of computer vision models to extract critical housing stock information from drone images, aerial orthophotos, LiDAR data, and street view images for vulnerability assessment and risk mapping. These models supported government-led climate adaptation initiatives across the Caribbean and produced baseline exposure data for Dominica, St. Lucia, and Grenada. Contributed the resulting datasets to the World Bank Data Catalog.
- Led knowledge exchange sessions and developed comprehensive training materials on AI-assisted building delineation and roof classification for government staff, community mappers, and disaster responders, as part of capacity-building initiatives in Caribbean small island developing states. **Colab Notebooks**: Part 1 and Part 2.
- Organized workshops for Disaster and Climate Risk Data Fellows and World Bank consultants on (1) Intro to Machine Learning, (2) Intro to Deep Learning, (3) Intro to Computer Vision and Remote Sensing, and (4) Hands-on ML/DL.
- Presented at various conferences and workshops, including Applied Machine Learning Days (AMLD) 2024, Climate Informatics 2024, ICCV'23 AI for Humanitarian Assistance and Disaster Response Workshop, NeurIPS'23 Tackling Climate Change using ML Workshop, and the American Geographical Society Fall Symposium 2023.
- **Supervisors**: Prof. Caroline Gevaert, Dr. Nuala Margaret Cowan, and Pierre Chrzanowski

AI4EO Future Lab | Technical University of Munich (TUM) — **Munich, DEU**
Research Fellow, AI4EO Beyond Fellows Program — Aug 2022 - Jan 2023

- Investigated the applications of geospatial ML for building attribute recognition and evaluated the cross-country generalizability of ML models trained on urban form features vs. multispectral Sentinel-2 satellite images.
- Collaborated with TU Berlin and the Mercator Research Institute on Global Commons and Climate Change (MCC) on building type classification using the EUBUCCO dataset under the Generalizability & Transferability Working Group at the Chair of Data Science in Earth Observation at TUM.
- Co-authored papers and tutorials on building type classification and responsible AI4EO, accepted at the Joint Urban Remote Sensing Event (JURSE) and the International Geoscience and Remote Sensing Symposium (IGARSS).
- **Supervisor**: Prof. Xiaoxiang Zhu

Thinking Machines Data Science, Inc. — **Taguig City, PHL**
GeoAI Team Lead | Machine Learning Researcher — Mar 2018 - Jul 2022

- Led the generation of high-resolution, nationwide poverty maps across the Philippines using ML, computer vision, demographic and health survey data, satellite imagery, social media data, and volunteered geographic information. These maps supported targeted humanitarian interventions by UNDP Philippines and the Zero Extreme Poverty Movement 2030. **Collaborators**: UNICEF and QCRI.
- Accelerated the detection of 350+ migrant settlements in Colombia using ML and time-series Sentinel-2 satellite images during the Venezuelan mass migration crisis. Model predictions were ground-validated by local contributors in Colombia using mobile apps; the results were shared with local NGOs and international development agencies, enabling more efficient, targeted humanitarian aid and response operations. **Collaborators**: iMMAP Colombia and Premise Data.
- Led a team of 7 ML researchers and engineers in developing our GeoAI product, leveraging ML and computer vision for building delineation and classification, land use and land cover classification, and socioeconomic class classification from high-resolution satellite images to support high-CAPEX decision-making by major telcos in Southeast Asia.
- Managed a team of 5 ML researchers under the GeoAI team; responsibilities included setting and monitoring team goals and having regular 1:1 meetings for coaching and mentoring; organized the GeoAI Bootcamp, an internal training program consisting of lectures, workshops, and hackathon events to accelerate upskilling of junior ML researchers.

- Co-authored multiple peer-reviewed papers on ML for socioeconomic development and humanitarian assistance; conducted extensive literature reviews on AI for climate change mitigation and adaptation to support grant proposal development under the Sustainability Team.

Philippine-California Advanced Research Institutes (PCARI) **Quezon City, PHL**
Research Fellow II Aug 2015 - Feb 2018

- Conducted research under the PCARI Project IIID 2013-054: Resilient Cyber-Physical Societal Scale Systems at the UPD Department of Computer Science, Computer Security Group; coordinated with a major water utility company for R&D of resilient cyber-physical infrastructure; developed a framework for finding optimal and resilient placements of hydraulic pressure sensors in water distribution networks using genetic algorithms (e.g. NSGA-II).

TECHNICAL SKILLS

- Python, SQL, BigQuery, Jupyter, Pandas, NumPy, SciPy, NetworkX, Scikit-learn, Pytorch, Weights & Biases, QGIS, GDAL, GeoPandas, Rasterio, Google Earth Engine, Google Cloud Platform, Git, Asana, Docker, AzureML, Linux
- **Languages**: Filipino (native), English (fluent)

EDUCATION

Master of Science in Computer Science **Aug 2015 - Jan 2018**
University of the Philippines Diliman
Grade: 1.15 (1.00 highest; 5.00 lowest)
PCARI Scholarship

Bachelor of Science in Computer Science **Jun 2011 - Jun 2015**
University of the Philippines Diliman
Grade: 1.36 (1.00 highest; 5.00 lowest)
Magna Cum Laude
Phi Kappa Phi Honor Society

LEADERSHIP & COMMUNITY OUTREACH

Finalist for Women in AI (WAI) APAC: AI for Social Good Award **Jun 2024**

- The WAI Awards honors women from diverse backgrounds making significant advances in AI. The AI for Social Good Award celebrates initiatives that use AI to solve societal challenges. **Venue**: Museum of Contemporary Art, Sydney, AUS.

Tutorials Co-lead | Climate Change AI - Core Team **2020 - Present**

- Managing the CCAI tutorial series; co-organized the tutorials track at the Tackling Climate Change with Machine Learning Workshop at ICLR'24, NeurIPS'23, ICLR'23, NeurIPS'22, & NeurIPS'21, leading to the creation of 25+ tutorials
- Contribute to the annual CCAI Sumer School Program by developing new tutorials, updating existing tutorials, and recording tutorial walkthroughs in collaboration with the broader summer school program team.

AI/ML Tech Lead | Women Who Code Manila **2017 - 2024**

- Facilitated monthly study group sessions where members can learn about best practices in AI/ML
- Co-organized Filipinas in Tech 2022: Women in Data Science featuring leading Filipina data scientists in the industry and academia as speakers and panelists, focusing on career development and special topics.

Social Impact Mission | Venezuelan Mass Migration Crisis **May 2019**

- Conducted field visits and supported data collection in Bogota and La Guajira to assess the living conditions of Venezuelan migrants in informal settlements. This mission resulted in two USAID-funded AI for humanitarian action projects. **Collaborators**: UNICEF Colombia and iMMAP

Reviewer/Meta-reviewer

- Frontiers in Climate, Frontiers in Big Data - Data Analytics for Social Impact, Philippine Journal of Science (PJS), IEEE Latin America Transactions Special Issue on AI and Sustainability, Climate Informatics 2024, Tackling Climate Change with Machine Learning Workshop at ICLR'23, NeurIPS'22, & NeurIPS'21

PUBLICATIONS & PROCEEDINGS

- Doerksen, K.*, **Tingzon, I.***, Fibaek, C., Schneider, R., & Kim, D. (2024) "AI-powered school mapping and connectivity status prediction using Earth Observation." ICLR'24 Machine Learning for Remote Sensing Workshop.
- **Tingzon, I.**, Cowan, N.M., & Chrzanowski, P. (2024) "Mapping housing stock characteristics from drone images for climate resilience in the Caribbean." Climate Informatics 2024. In review at Environmental Data Science.
- **Tingzon, I.**, Cowan, N.M., & Chrzanowski, P. (2023) "Fusing VHR post-disaster aerial imagery and LiDAR data for roof classification in the Caribbean." In Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops, pp. 3740-3747. ICLR'23 AI for Humanitarian Assistance and Disaster Response (HADR) Workshop.
- **Tingzon, I.**, Miraflor, J.M., Zhu, X.X., & Kochupillai, M. (2023) "Towards impactful applications of AI4EO in the Global South." In 2023 Joint Urban Remote Sensing Event (JURSE), pp. 1-4. IEEE. International Future Lab AI4EO Symposium 2022. **Best Poster Runner-up**.

- Fatehkia, M., **Tingzon, I.**, Orden, A., Sy, S., Sekara, V., Garcia-Herranz, M., & Weber, I. (2020) "Mapping socioeconomic indicators using social media advertising data." EPJ Data Science, 9(1), 22.
- Ledesma, C., Garonita, O.L., Flores, L.J., **Tingzon, I.**, & Dalisay, D. (2020) "Interpretable poverty mapping using social media data, satellite images, and geospatial information." NeurIPS'20 Workshop on Machine Learning for the Developing World (ML4D). **Best Paper**.
- **Tingzon, I.**, Dejito, N., Flores, R.A., De Guzman, R., Carvajal, L., Zapata Erazo, K., Contreras Cala, I.E., Villaveces, J. Rubio, D., & Ghani, R. "Mapping new informal settlements using machine learning and time-series satellite images: An application in the Venezuelan migration crisis." IEEE/ITU International Conference on Artificial Intelligence for Good (2020). KDD'20 Fragile Earth Workshop. **Best Paper. Best Presenter**.
- **Tingzon, I.**, Orden, A., Sy, S., Sekara, V., Weber, I., Fatehkia, M., Garcia-Herranz, M. & Kim, D. (2019) "Mapping poverty in the Philippines using machine learning, satellite imagery, and crowd-sourced geospatial information." The International Archives of Photogrammetry, Remote Sensing, and Spatial Information Sciences.

TALKS & PRESENTATIONS

- **Mapping Housing Stock Characteristics from Drone Images for Climate Resilience in the Caribbean.** Climate Informatics 2024. 22 April 2024. Alan Turing Institute, BMA House, London, UK. Virtual.
- **Applied Machine Learning Days (AMLD) Swiss Federal Institute of Technology Lausanne (EPFL).** Invited Panelist and Presenter for the tracks "Accelerating Climate Change Action Through Machine Learning" and "AI & Space – Algorithms for Socio-economic Benefits". 25-26 March 2024. SwissTech Convention Center. Lausanne, Switzerland.
- **Building Climate Resilience in the Caribbean using AI, Drone Images, and Street View Photos.** Invited Speaker at the Columbia Climate School - Spring 2024. 20 March 2024. Columbia University, New York City, USA. Virtual.
- **Mapping Housing Stock from Drone Images and Street View Photos for Climate Resilience in the Caribbean.** Lightning Talk at the American Geographical Society Fall Symposium, Geography 2050: The Changing Map of Risk, Hazards, & Finance. 16 November 2023. Columbia University, New York City, USA.
- **Generating Exposure Data Layers using AI & Earth Observation for Housing Resilience in the Caribbean.** Risk Data Library Workshop. 14 November 2023. The World Bank Headquarters at Washington DC, USA.
- **Tackling Climate Change with AI: From Energy to Agriculture to Disaster Response.** Co-presented with Priya Donti. 6th Indonesia's SDGs Annual Conference (SAC) 2023. 7 November 2023. Virtual.
- **Climate Change and Machine Learning: Opportunities, Challenges, and Considerations.** 9th Annual Public Policy Conference (APPC). 19 September 2023. Asian Institute of Management, Makati City, Philippines.
- **Harnessing Digital Innovation for Inclusive and Sustainable Risk Management.** Invited Panelist at the GFDRR Partnership Days 2023. 22 May 2023. The World Bank Headquarters at Washington DC, USA.
- **Towards Responsible and Impactful Applications of AI and Earth Observation.** Deeplearning.ai Pi & AI Event, Building Ethical AI Companions: Balancing Innovation with Responsible Design. 20 May 2023. Virtual.
- **Identifying Ethical Issues in Earth Observation Research: Hands-on Tutorial with Case Studies**. Kochupillai, Mrinalini, Michael Schmitt, Simon Schneider, Conrad Albrecht, Matthias Häberle, Isabelle Tingzon. International Geoscience and Remote Sensing Symposium (IGARSS) 2023. Pasadena, California, USA.
- **Tutorial on Land Use and Land Cover (LULC) Classification using Pytorch and Google Earth Engine.** Climate Change AI Summer School 2022. 19 August 2022. Virtual. Colab Notebooks: Part 1 and Part 2
- **Data Science for Social Good**. Code Filipina 2019. 26 October 2019. Asia Pacific College, Makati, Philippines; Youth for Women in Technology Iloilo Chapter WiTalks Webinar. 18 August 2021. Virtual.
- **Research and Challenges of ML/AI against COVID-19 and Climate Change in the Context of Developing Countries**. Invited Panelist at Practical Machine Learning for Developing Countries Workshop ICLR 2021. 8 May 2021. Virtual.
- **Detecting Informal Settlements using Machine Learning, Satellite Images, and Mobile Apps**. Lightning Talk at the Geo for Good Summit 2020. 20-22 October 2020. Virtual.
- **Methodologies and Tools for Poverty Prediction**. Workshop on The Use of Big Data in Official Statistics for Measuring Digital Economy and Sustainable Development. 9 May 2019. National Administrative Department of Statistics (DANE), Bogota, Colombia.
- **Using Machine Learning and Satellite Images to Zero in on the Philippines' Most Vulnerable Communities**. Python Conference Asia Pacific (PyCon APAC) 2019. 24 February 2019. iAcademy, Makati, Philippines.
- **Shedding Light on Philippine Poverty**. AI for Social Good Workshop. 17-18 February 2019. Qatar Computing Research Institute, Hamad Bin Khalifa University. Ar-Rayyan, Qatar.