

# Isabelle Tingzon

✉ issatingzon@gmail.com    🔗 issa-tingzon.github.io    in issatingzon

## EXPERIENCE

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### The World Bank

*Geospatial Data Scientist (JPA)*

*Disaster and Climate Risk Data Fellow*

Washington DC, USA

*Jan 2025 - Present*

*Feb 2023 - Dec 2024*

- Led AI-driven climate resilience initiatives under the project, Digital Earth for Resilient Housing and Infrastructure in the Caribbean, as featured in the UNFCCC Technology Executive Committee Information Note on “AI for Climate Action in Developing Countries: Opportunities, Challenges, and Risks”, launched at COP29.
- Leveraged drone imagery, aerial orthophotos, LiDAR data, and street view imagery to generate large-scale maps of building stock characteristics using instance segmentation models (SAM, Mask R-CNN) and image classification models (CNNs, ViTs) in support of government-led climate adaptation efforts.
- Designed tutorials and conducted training on AI-assisted building delineation and roof classification for government staff, community mappers, and disaster responders as part of capacity-building initiatives in the Caribbean.
- Developed grant proposals, resulting in 100K USD worth of funding to expand our AI-driven pilot work in Dominica and Saint Lucia to other small island developing states in the Caribbean.
- Presented at key conferences: Applied Machine Learning Days (AMLD) 2024, Climate Informatics 2024, ICCV’23 AI for Humanitarian Assistance and Disaster Response Workshop, and American Geographical Society Fall Symposium 2023.

### United Nations Children’s Fund (UNICEF)

*Data Science Consultant*

Barcelona, ESP

*Oct 2023 - Jan 2025*

- Led our AI-enabled global school mapping initiative in support of Giga, a UNICEF-ITU program aimed at connecting every school to the internet and advancing universal school connectivity.
- Built an end-to-end pipeline for large-scale school mapping using high-resolution Maxar satellite imagery, weakly supervised computer vision models (ViTs, CNNs), and explainable AI (XAI) techniques.
- Developed school mapping models for 10+ countries and produced nationwide maps of school location predictions across 7 partner countries in Africa and Asia using Dell’s high-performance computing (HPC) infrastructure.
- Co-developed a human-in-the-loop model validation tool to help government partners discover non-geolocated schools and improve the quality and completeness of official school location datasets.
- Facilitated knowledge transfer by presenting technical concepts to UNICEF country offices, government agencies, and ministries of education through comprehensive reports, training sessions, and presentations.
- Published at the AAAI 2025 Special Track on AI for Social Impact (oral, top 5% of 470 submissions) and won Best Innovative Technology Application Award at the IEEE Connecting the Unconnected (CTU) Summit 2024

### AI4EO Future Lab | Technical University of Munich (TUM)

*Beyond Fellow*

Munich, DEU

*Aug 2022 - Jan 2023*

- Generalizability & Transferability Working Group at the Chair of Data Science in Earth Observation
- 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.

### Thinking Machines Data Science

*Machine Learning Researcher, GeoAI Team Lead*

Taguig City, PHL

*Mar 2018 - Jul 2022*

- 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.
- Generated high-resolution, nationwide poverty maps across using computer vision, satellite imagery, social media data, and volunteered geographic information to support targeted humanitarian interventions by UNDP Philippines and the Zero Extreme Poverty Movement 2030.
- Accelerated the detection of 350+ migrant settlements in Colombia using ML and time-series Sentinel-2 satellite images in the context of the Venezuelan mass migration crisis. Model predictions were ground-validated by local contributors in Colombia using mobile apps, and 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.
- Conducted field visits in Bogota and La Guajira to support data collection for assessing the living conditions of Venezuelan migrants situated in informal settlements in Colombia. This mission resulted in two USAID-funded AI for humanitarian

action projects worth 55K USD. Collaborators: UNICEF Colombia and iMMAP

- Developed grant proposals under the Sustainability Team, resulting in two AI for climate action projects funded by the CCAI Innovation Fund and the Lacuna Fund worth 150K+ USD.

## TECHNICAL SKILLS

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**Data Science/AI/ML:** Python, Pytorch, SQL, BigQuery, Jupyter, Pandas, NumPy, SciPy, Scikit-learn, Weights & Biases

**GIS:** QGIS, GDAL, GeoPandas, Rasterio, Google Earth Engine (GEE)

**Cloud Computing:** GCP, AWS, Azure

## EDUCATION

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**University of the Philippines Diliman**

*Master of Science in Computer Science*

Quezon City, PHL

Aug 2015 - Jan 2018

- Grade: 1.15 (1.00 highest; 5.00 lowest)

- PCARI Scholarship

**University of the Philippines Diliman**

*Bachelor of Science in Computer Science*

Quezon City, PHL

Jun 2011 - Jun 2015

- Grade: 1.36 (1.00 highest; 5.00 lowest)

- Magna Cum Laude, Phi Kappa Phi

## AWARDS

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1st Place Innovative Technologies, IEEE Connecting the Unconnected (CTU) Challenge 2024 Dubai, UAE | Oct 2024

Women in AI (WAI) Asia and the Pacific (APAC) 2024: AI for Social Good Award Sydney, AUS | Jun 2024

Best Poster Runner-up, International Future Lab AI4EO Symposium 2022 Munich, DEU | Oct 2022

Best Paper, NeurIPS 2020 Workshop on Machine Learning for the Developing World (ML4D) Dec 2020

Best Paper and Best Presenter at KDD 2020 Fragile Earth Workshop Jul 2020

## VOLUNTEER EXPERIENCE

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Tutorials Co-lead | Climate Change AI (CCAI) - Core Team 2020 - Present

- Manage 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 development of 25+ tutorials.

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


- Facilitated monthly study group sessions; co-organized "Filipinas in Tech 2022: Women in Data Science", featuring leading Filipina data scientists as speakers/panelists, with a focus on career development and special topics.


## PUBLICATIONS


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Tingzon, I., Ozturk, U. C., & Dotu, I. (2025). Large-scale school mapping using weakly supervised deep learning for universal school connectivity. *Proceedings of the AAAI Conference on Artificial Intelligence*, 39(27), 28449-28457.


[10.1609/aaai.v39i27.35067](https://doi.org/10.1609/aaai.v39i27.35067) 


Tingzon, I., Cowan, N. M., & Chrzanowski, P. (2024). Mapping housing stock characteristics from drone images for climate resilience in the Caribbean. *Environmental Data Science*, 3, e29. [10.1017/eds.2024.46](https://doi.org/10.1017/eds.2024.46) 


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 (ICCV) Workshops*, 2023, pp. 3740-3747. [abs/2307.16177](https://arxiv.org/abs/2307.16177) 


Tingzon, I., Miraflor, J.M., Zhu, X.X., & Kochupillai, M. (2023). "Towards impactful applications of AI4EO in the global south." *2023 Joint Urban Remote Sensing Event (JURSE)*, pp. 1-4. IEEE. [10.1109/JURSE57346.2023.10144197](https://doi.org/10.1109/JURSE57346.2023.10144197) 

Maksabedian Hernandez, E. J., Tingzon, I., Ampil, L., & Tiu, J. (2021). Identifying chronic disease patients using predictive algorithms in pharmacy administrative claims: an application in rheumatoid arthritis. *Journal of Medical Economics*, 24(1), 1272-1279. [10.1080/13696998.2021.1999132](https://doi.org/10.1080/13696998.2021.1999132) 

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. [10.1140/epjds/s13688-020-00235-w](https://doi.org/10.1140/epjds/s13688-020-00235-w) 

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 Machine Learning for the Developing World (ML4D) Workshop. **Best Paper.** [abs/2011.13563](https://arxiv.org/abs/2011.13563) 

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. (2020). "Mapping new informal settlements using machine learning and time-series satellite images: An application in the Venezuelan migration crisis." In *Proceedings of 2020 IEEE/ITU International Conference on Artificial Intelligence for Good (AI4G)* (pp. 198-203). IEEE. KDD'20 Fragile Earth Workshop. **Best Paper, Best Presenter.** [10.1109/AI4G50087.2020.9311041](https://doi.org/10.1109/AI4G50087.2020.9311041) 

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*, XLII-4/W19, 425–431. [10.5194/isprs-archives-XLII-4-W19-425-2019](https://doi.org/10.5194/isprs-archives-XLII-4-W19-425-2019) 

## INVITED TALKS AND PRESENTATIONS

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- **Bridging Data Gaps in the Global South: Harnessing Geospatial Data for Climate Resilience and Universal Connectivity.** Invited Speaker at the "Building Data Together: Building-related Open Microdata Technical Workshop" at the OECD Laboratory for Geospatial Analysis. 24 January 2025. Paris, France.
- **Large-scale School Mapping using AI and Satellite Images for Universal School Connectivity.** Erasmus Mundus Giga Meet. 28 November 2024. Campus Poblenou, Universitat Pompeu Fabra (UPF), Barcelona, Spain.
- **Ethics and Biases in UNICEF Giga's AI-enabled School Mapping Work.** AI4Development Conference. 28 October 2024. Norrskén Social Hub, Barcelona, Spain.
- **Advancing Universal School Connectivity through AI-enabled School Mapping.** IEEE Connecting the Unconnected Summit 2024 — IEEE Future Networks Works Forum. 14-15 October 2024. Dubai, UAE.
- **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.
- **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.** Guest Lecturer at the Columbia Climate School. 20 March 2024. Columbia University, New York City, USA.
- **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 Danti at the 6th Indonesia's SDGs Annual Conference 2023. 7 November 2023.
- **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.
- **Tutorial on Land Use and Land Cover (LULC) Classification using Pytorch and Google Earth Engine.** Co-authored with Ankur Mahesh. Climate Change AI Summer School 2022. 19 August 2022.
- **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.
- **Detecting Informal Settlements using Machine Learning, Satellite Images, and Mobile Apps.** Lightning Talk at the Geo for Good Summit 2020. 20-22 October 2020.
- **Methodologies for Poverty Prediction.** Workshop on Big Data in Official Statistics for Measuring Digital Economy and Sustainable Development. 9 May 2019. National Administrative Department of Statistics, 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.