# Isabelle Tingzon

issatingzon@gmail.com | issa-tingzon.github.io | linkedin.com/in/issatingzon

## PROFESSIONAL EXPERIENCE

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

- Leading our AI-enabled school mapping project, which leverages state-of-the-art computer vision (CV) models 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.
- Supervisors: Dr. Do-Hyung Kim and Dr. Ivan Dotu

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

- Led the development of machine learning (ML) and CV models for the automated generation of critical housing stock information (building footprints; roof type and roof material classification maps) using deep learning and Earth observation data (drone images, aerial orthophotos, and LiDAR data) to enhance climate resilience of small island developing states in the Caribbean, namely Dominica, Saint Lucia, and Grenada.
- Organized a 4-part workshop for the Risk Data Library (RDL) Fellows and World Bank Group consultants on (1) Introduction to Machine Learning, (2) Introduction to Deep Learning, (3) Introduction to Computer Vision and Remote Sensing, and (4) Hands-on ML using Python and Colab notebooks.
- Created training material for building delineation and roof classification for government staff, GIS practitioners, community mappers, and disaster responders as part of local capacity-building initiatives under the Digital Earth Project for Resilient Housing and Infrastructure. Colab notebooks: Part 1 and Part 2
- Co-authored peer-reviewed papers on mapping housing stock characteristics for disaster reduction, accepted at the ICCV'23 AI for Humanitarian Assistance and Disaster Response Workshop, NeurIPS'23 Tackling Climate Change using Machine Learning Workshop, and the American Geographical Society Fall Symposium 2023.
- Supervisors: Pierre Chrzanowski, Dr. Nuala Margaret Cowan, and Dr. Andrea Garcia Tapia

**AI4EO Future Lab | Technical University of Munich (TUM)**          Munich, DEU
Beyond 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 and CV 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 as a member of 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 and Machine Learning Researcher                        Mar 2018 - Jul 2022

- Led a team of 7 ML researchers and engineers in the development of our GeoAI product, which leverages ML and CV algorithms for automated building footprint delineation and classification, land use and land cover (LULC) classification, and socioeconomic class classification using multimodal geospatial datasets to support network demand planning for major telecommunications companies across Southeast Asia. Client: Globe Telecom
- Generated high-resolution nationwide maps of socioeconomic indicators (e.g. asset-based wealth index, educational attainment) across the Philippines using ML and CV techniques, ground truth demographic and health survey data, satellite imagery, social media data, volunteered geographic information, and other geospatial data sources in support of targeted humanitarian interventions led by UNDP Philippines and the Zero Extreme Poverty 2030 Movement. Collaborators: UNICEF Innovation and the Qatar Computing Research Institute.
- Accelerated the discovery of 300+ migrant settlements that emerged in Colombia during the Venezuelan mass migration crisis using ML and historical Sentinel-2 satellite images, improving the efficiency of humanitarian aid and response operations. Collaborators: iMMAP Colombia and Premise Data.
- Managed a team of 5 ML researchers; 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 geospatial ML researchers.

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

- 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).

## 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

## TECHNICAL SKILLS

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

## VOLUNTEER EXPERIENCE & COMMUNITY OUTREACH

**Tutorials Co-lead | Climate Change AI - Core Team**                              2020 - Present
- Manage the CCAI Tutorial Series; responsibilities include developing tutorial notebook templates and guidelines, coordinating review efforts for tutorial proposals and notebooks, and providing feedback to tutorial authors to ensure technical correctness and broad accessibility.
- 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+ CCAI tutorials (as of January 2024)

**Tech Lead of AI/ML | Women Who Code Manila**                                    2017 - Present
- Facilitated monthly study group sessions where members can learn about best practices in data science and machine learning, with the goal of empowering women to excel in tech.
- 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 | Identifying Social Needs in La Guajira, Colombia**       May 8-12, 2019
- Conducted field visits in Bogota and La Guajira with UNICEF Colombia and iMMAP to assess the living conditions of Venezuelan migrants in informal settlements with the goal of designing methodologies for small area estimation of poverty and water and sanitation needs in territories lacking information.

**Academic Services | Reviewer/Meta-reviewer**
- **Journals**: Frontiers in Big Data - Data Analytics for Social Impact, Philippine Journal of Science (PJS), IEEE Latin America Transactions Special Issue on AI and Sustainability
- **Workshops**: Tackling Climate Change with Machine Learning Workshop at ICLR'23, NeurIPS'22, & NeurIPS'21
- **Grants**: CCAI Innovation Grants 2023

## PUBLICATIONS & PROCEEDINGS

1. Doerksen, Kelsey[1], **Isabelle Tingzon**[1], and Do-Hyung Kim. "AI-powered school mapping and connectivity status prediction using Earth Observation." *ICLR 2024 Machine Learning for Remote Sensing Workshop.*
2. **Tingzon, Isabelle,** Nuala Margaret Cowan, and Pierre Chrzanowksi. "Mapping housing stock characteristics from drone images for climate resilience in the Caribbean." *NeurIPS 2023 Workshop on Tackling Climate Change with Machine Learning.*
3. **Tingzon, Isabelle**, Nuala Margaret Cowan, and Pierre Chrzanowski. "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. 2023. **Spotlight**.
4. **Tingzon, Isabelle**, James Matthew Miraflor, Xiao Xiang Zhu, and Mrinalini Kochupillai. "Towards impactful applications of AI4EO in the Global South." *In 2023 Joint Urban Remote Sensing Event (JURSE)*, pp. 1-4. IEEE, 2023. *International Future Lab AI4EO Symposium 2022*. **Runner-up Best Poster**.

---

[1] equal contribution

5. Fatehkia, Masoomali, **Isabelle Tingzon**, Ardie Orden, Stephanie Sy, Vedran Sekara, Manuel Garcia-Herranz, and Ingmar Weber. "Mapping socioeconomic indicators using social media advertising data." *EPJ Data Science* (2020).

6. Ledesma, Chiara, Oshean Lee Garonita, Lorenzo Jaime Flores, **Isabelle Tingzon**, and Danielle Dalisay. "Interpretable poverty mapping using social media data, satellite images, and geospatial information." *NeurIPS 2020 Workshop on Machine Learning for the Developing World (ML4D)*. **Best Paper**.

7. **Tingzon, Isabelle**, Niccolo Dejito, Ren Avell Flores, Rodolfo De Guzman, Liliana Carvajal, Katerine Zapata Erazo, Ivan Enrique Contreras Cala, Jeffrey Villaveces, Daniela Rubio, and Rayid Ghani. "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 2020 *Fragile Earth Workshop*. **Spotlight. Best Paper. Best Presenter**.

8. **Tingzon, Isabelle**, Ardie Orden, Stephanie Sy, Vedran Sekara, Ingmar Weber, Masoomali Fatehkia, Manuel Garcia Herranz, and Do-Hyung Kim. "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* (2019), ICML 2019 *Workshop on AI for Social Good (AI4SG)*.

# TALKS & PRESENTATIONS

- **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. 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. Virtual. Presentation

- **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. Presentation

- **Risk Data Library Workshop: Generating Exposure Data Layers using AI & Earth Observation for Housing Resilience in the Caribbean.** 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. Presentation

- **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. Presentation

- **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. Presentation | 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.

- **Research and Challenges of ML/AI against COVID-19 and Climate Change in the Context of Developing Countries**. Invited Panelist at the 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. Presentation

- **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, 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. Presentation

- **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. Presentation