Maya Okawa

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EXPERIENCE

March, 2023 – Present Research Scientist at CBS-NTT Program in Physics of Intelligence,
Harvard University.
  Research on understanding the behavior of generative AI models through
  a scientific lens, focusing on psychological and neuroscientific perspectives.

Sep, 2014 – Feb, 2023 Research Scientist, **NTT R&D**, Tokyo, Japan
  2024 – 2018 Engineer on time-series models for real-world applications, including
    airport logistics and crowd management at large-scale social events.
  2019 – 2023 Research on integration of deep learning and social science, social
    network analysis and machine learning to analyze complex social behaviors.

EDUCATION

2019 - 2022 **Kyoto University**, Kyoto, Japan
  Ph.D. in Intelligence Science and Technology.

2012 - 2014 **University of Tokyo**, Tokyo, Japan
  M.S. in Science. High energy Physics.
  Thesis: Search for the Higgs boson in the ttH channel with
  the LHC-ATLAS experiment.

2008 - 2012 **Sophia University**, Tokyo, Japan
  B.S. in Science. Condensed matter physics.

PUBLICATIONS

ARTICLES IN PEER-REVIEWED CONFERENCE PROCEEDINGS

Representation Shattering in Transformers: A Synthetic Study with Knowledge Editing
Kento Nishi, **Maya Okawa**, Rahul Ramesh, Mikail Khona, Hidenori Tanaka, and Ekdeep Singh Lubana
  ICML - International Conference on Machine Learning, 2025

ICLR: In-Context Learning of Representations
   Christopher F. Park, Andrew Lee, Ekdeep Singh Lubana, Young Yang, **Maya Okawa**, Kento Nishi, Michael Wattenberg, Hidenori Tanaka
   ICLR – International Conference on Learning Representations, 2025

Dynamics of Concept Learning and Compositional Generalization
   Young Yang, Christopher F. Park, Ekdeep Singh Lubana, **Maya Okawa**, Wei Hu, Hidenori Tanaka
   ICLR – International Conference on Learning Representations, 2025

Emergence of Hidden Capabilities: Exploring Learning Dynamics in Concept Space
   Maya Okawa*, Core F Park*, Andrew Lee, Ekdeep S Lubana, Hidenori Tanaka
   NeurIPS − Advances in Neural Information Processing Systems, 2024 (**Spotlight**)

Towards an Understanding of Stepwise Inference in Transformers: A Synthetic Graph Navigation Model
   Mikail Khona, **Maya Okawa**, Jan Hula, Rahul Ramesh, Kento Nishi, Robert Dick, Ekdeep Singh Lubana, Hidenori Tanaka
   ICML − The International Conference on Machine Learning, 2024

Compositional Abilities Emerge Multiplicatively: Exploring Diffusion Models on a Synthetic Task
   Maya Okawa, Ekdeep S Lubana, Robert Dick, Hidenori Tanaka
   NeurIPS − Advances in Neural Information Processing Systems, 2023

Predicting Opinion Dynamics via Sociologically-Informed Neural Networks
   Maya Okawa, Tomoharu Iwata
   KDD − 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2022

Hawkes Processes for Discovering Time-evolving Communities' States behind Diffusion Processes
   Maya Okawa, Tomoharu Iwata, Yusuke Tanaka, Hiroyuki Toda, Takeshi Kurashima, Hisashi Kashima
   KDD − 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2021

Deep Mixture Point Processes: Spatio-temporal Event Prediction with Rich Contextual Information Dynamic
   Maya Okawa, Tomoharu Iwata, Takeshi Kurashima, Yusuke Tanaka, Hiroyuki Toda, Naonori Ueda
   KDD − 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2019

Refining Coarse-Grained Spatial Data Using Auxiliary Spatial Data Sets with Various Granularities
   Yusuke Tanaka, Tomoharu Iwata, Toshiyuki Tanaka, Takeshi Kurashima, **Maya Okawa**, Hiroyuki Toda
   AAAI − 32th AAAI Conference on Artificial Intelligence, 2019

Spatially aggregated Gaussian processes with multivariate areal outputs

Yusuke Tanaka, Toshiyuki Tanaka, Tomoharu Iwata, Takeshi Kurashima, **Maya Okawa**, Yasunori Akagi, Hiroyuki Toda
NeurIPS −Advances in Neural Information Processing Systems, 2019

Online traffic flow prediction using convolved bilinear Poisson regression
Maya Okawa, Hideaki Kim, Hiroyuki Toda
MDM − 18th IEEE International Conference on Mobile Data Management, 2017

Visualization of Crowd movements at Large-scale Events
Maya Okawa, Aki Hayashi, Kim Hideaki, Takuya Nishimura, Hiroyuki Toda
VIS − IEEE Visualization Symposium, 2016

Visualization of What-If Forecasts for Proactive Crowd Control
Maya Okawa, Aki Hayashi, Hiroshi Sawada
PacificVIS − 12th IEEE Pacific Visualization Symposium, 2015

ARTICLES IN PEER-REVIEWED WORKSHOP PROCEEDINGS

Predicting traffic accidents with event recorder data
Yoshiaki Takimoto, Yusuke Tanaka, Takeshi Kurashima, Shuhei Yamamoto, **Maya Okawa**, Hiroyuki Toda
SIGSPATIAL Prediction of Human Mobility − 3th International Workshop on Prediction of Human Mobility, 2019

Real-time and proactive navigation via spatio-temporal prediction
Naonori Ueda, Futoshi Naya, Hitoshi Shimizu, Tomoharu Iwata, **Maya Okawa**, Hiroshi Sawada
Ubicomp UrbComp − 4th International Workshop on Urban Computing, 2015

ARTICLES IN PEER-REVIEWED JOURNALS

Context-aware Spatio-temporal Event Prediction via Convolutional Hawkes Processes
Maya Okawa, Tomoharu Iwata, Yusuke Tanaka, Hiroyuki Toda, Takeshi Kurashima, Hisashi Kashima
Machine Learning Journal (ECML-PKDD Journal Track)

Deep Mixture Point Processes
Maya Okawa, Tomoharu Iwata, Takeshi Kurashima, Yusuke Tanaka, Hiroyuki Toda, Naonori Ueda, Hisashi Kashima
Transactions of the Japanese Society for Artificial Intelligence

Marked Temporal Point Processes for Trip Demand Prediction in Bike Sharing Systems
Maya Okawa, Yusuke Tanaka, Takeshi Kurashima, Hiroyuki Toda, Tomohiro Yamada
IEICE TRANSACTIONS on Information and Systems, 2019

US PATENTS

Event prediction device, event prediction method, and event prediction program (2022)
  Maya Okawa, Hiroyuki Toda

Spatio-temporal event data estimating device, method, and program (2021)
  Maya Okawa, Hiroyuki Toda

Data prediction device, method, and program (2021)
  Maya Okawa, Hiroyuki Toda, Takeshi Kurashima

HONORS AND AWARDS

2017   **Honorable Mention Award**
            MDM −18th IEEE International Conference on Mobile Data Management
            Awarded by IEEE for the paper entitled: "Online traffic flow prediction using
            convolved bilinear Poisson regression."

2020   **Ph.D. Research Scholarship from Business Communication co., ltd.**

2022   **DBSJ Kambayashi Young Researcher Award**
            Awarded by Databases Society of Japan.

2022   **Telecommunications Award**
            Awarded by The Telecommunications Advancement Foundation.

INVITED TALKS

Aug, 2019   WebDB Forum
             Forum on Web and Database

Aug, 2020   NPO WIN, Tokyo, Japan
             The Advanced Institute of Wearable Environmental Information
             Network, Nonprofit Organization

PROFESSIONAL AFFILIATIONS AND SERVICES

2019–2021   Committee Member
              AAAI, Association for the Advancement of Artificial Intelligence

2023–   Committee Member
              PAKDD, Pacific-Asia Conference on Knowledge Discovery and Data Mining