

# Heishiro Kanagawa

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## Employment History

- Nov. 2022 – Present    **Research Associate.** School of Mathematics, Statistics and Physics, Newcastle University, UK. Host: Chris Oates.
- Jul. 2019 – Oct. 2019    **Research Intern.** Facebook Reality Labs, Facebook, Redmond, WA, USA. Description: Development of models of human episodic memory and event recognition. Bayesian modelling of behavioural data.
- Jun. 2017 – Aug. 2017    **Research Assistant.** RIKEN Center for Advanced Intelligence Project (AIP), Tokyo, Japan. Description: Literature survey of few-shot learning.
- Jul. 2015 – Aug. 2017    **Research Intern.** Yahoo! JAPAN, Tokyo, Japan. Description: Research on cross-domain recommender systems, which resulted in publication at ECIR 2019.

## Education

- 2017 – 2022    **Ph.D., Gatsby Computational Neuroscience Unit, University College London, United Kingdom** in Machine Learning. Thesis title: *Statistical model evaluation using reproducing kernels and Stein's method.* Advisor: Arthur Gretton.
- 2015 – 2017    **M.Sc., Tokyo Institute of Technology, Japan** in Machine Learning. Thesis title: *Cross-domain recommendation via deep domain adaptation.* Advisor : Taiji Suzuki.
- 2012 – 2015    **B.Sc., Tokyo Institute of Technology, Japan** in Computer Science. Thesis title: *Nonparametric tensor estimation with Gaussian processes.* Advisor : Taiji Suzuki.

## Research Publications

### Journal Articles

- 1 Kanagawa, H., Jitkrittum, W., Mackey, L., Fukumizu, K., & Gretton, A. (2023, May). A kernel Stein test for comparing latent variable models. *Journal of the Royal Statistical Society Series B: Statistical Methodology*, 85(3), 986–1011.

### Working Papers





- 1 Kanagawa, H., Gretton, A., & Mackey, L. (2022). *Controlling moments with kernel Stein discrepancies.* arXiv: 2211.05408

### Conference Proceedings

- 1 Baum, J., Kanagawa, H., & Gretton, A. (2023). A kernel Stein test of goodness of fit for sequential models. In *Proceedings of the 40th international conference on machine learning, ICML 2023.*







- 2 Wenliang, L. K. & **Kanagawa, H.** (2021). Blindness of score-based methods to isolated components and mixing proportions. In *NeurIPS Workshop "Your Model is Wrong: Robustness and misspecification in probabilistic modeling"*. arXiv: 2008.10087
- 3 Xu, L., **Kanagawa, H.**, & Gretton, A. (2021). Deep Proxy Causal Learning and its Application to Confounded Bandit Policy Evaluation. In *Advances in Neural Information Processing Systems 35*.
- 4 Jitkrittum, W., **Kanagawa, H.**, & Schölkopf, B. (2020). Testing Goodness of Fit of Conditional Density Models with Kernels. In *Proceedings of the Thirty-Sixth Conference on Uncertainty in Artificial Intelligence, UAI 2020, virtual online, August 3-6, 2020* (p. 109). AUAI Press.
- 5 Wenliang, L. K., Moskovitz, T., **Kanagawa, H.**, & Sahani, M. (2020). Amortised Learning by Wake-Sleep. In *Proceedings of the 37th international conference on machine learning, ICML 2020*.
- 6 Jitkrittum, W., **Kanagawa, H.**, Sangkloy, P., Hays, J., Schölkopf, B., & Gretton, A. (2018). Informative Features for Model Comparison. In *Advances in Neural Information Processing Systems, 31*.
- 7 **Kanagawa, H.**, Kobayashi, H., Shimizu, N., Tagami, Y., & Suzuki, T. (2018). Cross-domain Recommendation via Deep Domain Adaptation. In *Advances in Information Retrieval 40th European Conference on IR Research, ECIR 2019*.
- 8 **Kanagawa, H.**, Suzuki, T., Kobayashi, H., Shimizu, N., & Tagami, Y. (2016). Gaussian process nonparametric tensor estimator and its minimax optimality. In *Proceedings of the 33rd international conference on machine learning, ICML 2016*.
- 9 Suzuki, T., **Kanagawa, H.**, Kobayashi, H., Shimizu, N., & Tagami, Y. (2016). Minimax Optimal Alternating Minimization for Kernel Nonparametric Tensor Learning. In *Advances in Neural Information Processing Systems 29*.

## Service

- Reviewer     AISTATS, ICLR, JMLR, Neural Networks, NeurIPS, TMLR, Biometrika, Journal of Multivariate Analysis
- Internal     Student representative at Gatsby Unit, UCL, 2019-2021
-  Member of the Gatsby Student-Staff Consultative Committee, 2019-2021
-  Organiser, the Gatsby external seminar series, 2020-2021

## Invited Talks

### Conferences and Workshops

- 2023     Bayes Comp 2023: Invited Session (Stein Discrepancies)
-  Lifting Inference with Kernel Embeddings (LIKE23), Bern, Switzerland
- 2022     Stein's Method: The Golden Anniversary (on behalf of Arthur Gretton, who was originally invited), Institute for Mathematical Sciences, National University of Singapore, Singapore
- 2020     Workshop on Emerging Themes in Computational Statistics, Institute of Statistical Mathematics, Tokyo, Japan
- 2019     Workshop on Functional Inference and Machine Intelligence, Institute of Statistical Mathematics, Tokyo, Japan.
-  Algorithon 2019, BlackRock, London, UK. <http://2019.algothon.org>.

### External Seminars

- 2022     Seminar on Advances in Probabilistic Machine Learning, Aalto University and ELLIS unit Helsinki

## Invited Talks (continued)

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- 2019
  - Twitter, London, UK
  - University of Bristol, Bristol, UK
  - Alan Turing Institute, London, UK

## Supervision

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- Jerome Baum (MSc.), 2022. Thesis title: "Kernel Goodness-of-Fit Testing for Sequences." Part of this work published at ICML 2023.
- Lizhang Chen (Intern), 2021. Project title: "Developing diagnostic tools for probabilistic models using the Pyro probabilistic programming language."
- Andrew Jiang (MSc.), 2020. Thesis title: "Kernel Tests for Markov Chain Monte Carlo Methods."

## Teaching experience

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### Teaching assistant

- 2018
  - Advanced Topics in Machine Learning, UCL
  - Probabilistic and Unsupervised Learning, UCL
  - Approximate Inference and Learning in Probabilistic Models, UCL

## Skills

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- Languages
  - Strong reading, writing and speaking competencies for English.
- Coding
  - Python, MATLAB, R,  $\LaTeX$ .

## Awards and Achievements

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- 2018
  - NeurIPS 2018 Travel Award
- 2017-2021
  - Gatsby Unit Studentship Fully-funded PhD studentship with a stipend awarded to 2-4 students per year.
- 2015-2017
  - Kawamura-Ikueikai Scholarship (720,000 JPY per annum)
- 2013
  - Nikki-Saneyoshi Scholarship (300,000 JPY)