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EXPERIENCE

Meta

Research Scientist, Meta SuperIntelligence Labs *Jan 2025 - Present*

- Currently Research Scientist at Meta's Super Intelligence Labs. In January, switched from Meta AI modeling to reasoning model development, focusing on teaching models to think, reason, and use tools.
- Led the work on improving tool use capabilties, re-defined the tool-use protocol used E2E stack, improving quality with more robust JSON adherence over multi-step multi-turn.
- Enabled native MCP support in LLM, re-designed tool-use training data that led to double-digit improvement on BFCL. Created a new MCP-Bench benchmark that covers real-world MCP tools.
- In Q2, re-vamped the overall training data and re-created the mixture from scratch, reducing the SFT data size by 10X while maintaining model quality.

Meta

Senior Staff Research Scientist / Manager, Meta AI *Jan 2023 - Dec 2024*

- In 2023-2024, led Meta AI's post-training for two years and debut Meta AI in 2023, and launched Llama 2 & 3 models into Family of Apps. Focused on improving model's general quality, growing it to 1 billion MAU. Talk at Meta's Connect Conference 2023.
- Boostrapped the modeling team from 0 to 50+ people, initiated and led the following work-streams: alignment & integration (i.e. large runs), core capabilities, tool use and orchestration, and data flywheel.
- Created and ran the core alignment work stream, drove model integration runs (SFT, RL, Eval). Developed Meta AI's in-house online RL framework with Mixture of Judges, improving reasoning, instructions following, safety, refusals, etc.
- Created the Orchestrator system and the Planner model for enabling tool use in Meta AI. It is responsible for tool routing and query rewrite into JSON outputs, which enables real-time information with search and image generation, and code execution.
- Initiated and led the core capabilities work, including instructions following, factuality, tool use, and multilinguality (enabled the roll-out to 12 languages and 40+ countries).
- Developed Meta AI's data flywheel for Reinforcement Learning from User Feedback, including sampling algorithms, user preference alignment, and flywheel annotation.
- Launched an updated Llama 3 model in a cascaded system to enable voice mode. Improved Meta AI's Planner model to enable photo editing with mutimodal inputs. Blog Post
- Led development of the search plugin that calls search engine and crawls the web content. Drove complex negotiations with Microsoft and closed contract alignment with them on the Bing-Meta Search API partnership for LLM grounding.
- Technical and hands-on, landed many of the above outcomes with a small team in 6 months. Initiated and drove multiple major technical and modeling directions as well as long-term planning for the broader org.

Facebook (now Meta)

Research Scientist (TLM), Facebook AI *June 2020 - Jan 2023*

- Led the CTO's special project to advance AI for better detecting hate speech with multi-modal multi-lingual content understanding (detects 94.7% of hate speech FB removes, 68% increase versus before).
- Led the development Meta's first Few-shot Learner which can work in 100+ languages, learns from images & text, and detects new forms of violations without human in the loop.
- Led the development of linear complexity Transformer architecture, which we called Linformer to enable scaling up GPU inference and analysis of billions of contents a day (Blog post).
- In MRS AI, built a team of 30+ engineers (from 7). Drove step-function improvement in topline metrics in IG & FB. Developed efficient Transformer based models in recs system and multi-domain user modeling. (Blog post).

Facebook (now Meta) **Seattle, WA**
Research Scientist *July 2017 - June 2020*

- Developed Reinforcement Learning based model optimizer to E2E optimize models for downstream tasks.
- Identified the AI gaps around multilingual and multimodal capabilities to correctly detect violation.
- Developed an evaluation framework for WPIE, a multimodal content understanding model for analyzing billions of contents per day.
- Built Tetris Planner, FB's first global storage rebalancing algorithm for PiB-scale data placement.

University of Washington **Seattle, WA**
Industry Advisory Board *Aug 2019–Dec 2024*

- Serves on the industry advisory board of the Data Science graduate program to improve its curriculum.

Facebook **Menlo Park, CA**
Data Scientist Intern (Rating: Rock-star, top 3%) *Jun 2016 - Aug 2016*

- Developed ML models to predict billion-scale user engagement and found effective infrastructure strategies.
- Developed an optimization framework for geo-spatial data on air field recommendation in 30 countries.

Cold Spring Harbor Laboratory (CSHL) **Cold Spring Harbor, NY**
Research Assistant (PhD student in residence) *Aug 2014 - Jun 2017*

- PhD thesis: Graphical and machine learning algorithms for large-scale genomics data (2000+ citations).
- Developed the best practice for detecting mutations in large-scale sequencing data (in Nature Protocols)
- Built a negative binomial mixture model to estimate and infer the genome properties (1000+ citations).

Cold Spring Harbor Laboratory **Cold Spring Harbor, NY**
Computational Science Developer *June 2013 - June 2014*

- Co-developed Scalpel, a SoTA graph assembly algorithm to detect mutations (in Nature Methods).

EDUCATION

Stony Brook University **Stony Brook, NY**
PhD in Applied Mathematics, President's Award to Distinguished Doctoral Students *2014–2017*

Johns Hopkins University **Baltimore, MD**
Visiting graduate student in Computer Science - Advisor moved to JHU *2016–2017*

Stony Brook University **Stony Brook, NY**
M.S. in Applied Mathematics and Statistics *2011–2013*

Sun Yat-sen University **Guangzhou, China**
B.S. in Optical Physics, Cum laude *2007–2011*

AWARDS

- 2017 President's Award to Distinguished Doctoral Students @ SBU (5 out of 449)
- 2017 The Woo-Jong Kim Dissertation Award @ AMS (1 out of 34)
- 2017 Excellence in Research Award @ AMS (5 out of 34)
- 2016 Research Access Project @ SBU
- 2016 Department Travel Grant @ AMS
- 2015 Reviewers' Choice @ The American Society of Human Genetics (Top 10%)
- 2015 Summer Institute in Statistics for Big Data Scholarship @ University of Washington
- 2014 Research Assistant Fellowship @ CSHL
- 2013 Research Access Project @ SBU
- 2013 Department Travel Grant @ AMS
- 2010 Outstanding Student Scholarship @ SYSU (Top 10%)

PUBLICATIONS Google Scholar

In Industry:

- Boosting LLM Reasoning via Spontaneous Self-Correction. *Xutong Zhao, Tengyu Xu, Xuewei Wang, Zhengxing*

*Chen, Di Jin, Liang Tan, Zishun Yu, Zhuokai Zhao, Yun He, Sinong Wang, **Han Fang**, Sarath Chandar, Chen Zhu* · COLM (2025)

- Reinforcement Learning from User Feedback. *Eric Han, Jun Chen, Karthik Abinav Sankararaman, Xiaoliang Peng, Tengyu Xu, Eryk Helenowski, Kaiyan Peng, Mrinal Kumar, Sinong Wang, **Han Fang**, Arya Talebzadeh* · arXiv (2025)
- Learning Auxiliary Tasks Improves Reference-Free Hallucination Detection in Open-Domain Long-Form Generation. *Chengwei Qin, Wenxuan Zhou, Karthik Abinav Sankararaman, Nanshu Wang, Tengyu Xu, Alexander Radovic, Eryk Helenowski, Arya Talebzadeh, Aditya Tayade, Sinong Wang, Shafiq Joty, **Han Fang**, Hao Ma* · **ACL** (2025)
- Think Smarter not Harder: Adaptive Reasoning with Inference Aware Optimization. *Zishun Yu, Tengyu Xu, Di Jin, Karthik Abinav Sankararaman, Yun He, Wenxuan Zhou, Zhouhao Zeng, Eryk Helenowski, Chen Zhu, Sinong Wang, Hao Ma, **Han Fang*** · **ICML** (2025)
- Step-KTO: Optimizing Mathematical Reasoning through Stepwise Binary Feedback *Yen-Ting Lin, Di Jin, Tengyu Xu, Tianhao Wu, Sainbayar Sukhbaatar, Chen Zhu, Yun He, Yun-Nung Chen, Jason Weston, Yuandong Tian, Arash Rahnama, Sinong Wang, Hao Ma, **Han Fang*** · arXiv (2025)
- Improving model factuality with fine-grained critique-based evaluator. *Yiqing Xie, Wenxuan Zhou, Pradyot Prakash, Di Jin, Yuning Mao, Quintin Fettes, Arya Talebzadeh, Sinong Wang, **Han Fang**, Carolyn Rose, Daniel Fried, Hejia Zhang* · **ACL** (2024)
- Multi-if: Benchmarking llms on multi-turn and multilingual instructions following. *Yun He, Di Jin, Chaoqi Wang, Chloe Bi, Karishma Mandyam, Hejia Zhang, Chen Zhu, Ning Li, Tengyu Xu, Hongjiang Lv, Shruti Bhosale, Chenguang Zhu, Karthik Abinav Sankararaman, Eryk Helenowski, Melanie Kambadur, Aditya Tayade, Hao Ma, **Han Fang**, Sinong Wang* · arXiv (2024)
- The Perfect Blend: Redefining RLHF with mixture of judges. *Tengyu Xu, Eryk Helenowski, Karthik Abinav Sankararaman, Di Jin, Kaiyan Peng, Eric Han, Shaoliang Nie, Chen Zhu, Hejia Zhang, Wenxuan Zhou, Zhouhao Zeng, Yun He, Karishma Mandyam, Arya Talabzadeh, Madian Khabsa, Gabriel Cohen, Yuandong Tian, Hao Ma, Sinong Wang, **Han Fang*** · arXiv (2024)
- Effective long-context scaling of foundation models. *Wenhan Xiong, Jingyu Liu, Igor Molybog, Hejia Zhang, Prajjwal Bhargava, Rui Hou, Louis Martin, Rashi Rungta, Karthik Abinav Sankararaman, Barlas Oguz, Madian Khabsa, **Han Fang**, Yashar Mehdad, Sharan Narang, Kshitiz Malik, Angela Fan, Shruti Bhosale, Sergey Edunov, Mike Lewis, Sinong Wang, Hao Ma* · **NAACL** (2024)
- Representation deficiency in masked language modeling. *Yu Meng, Jitin Krishnan, Sinong Wang, Qifan Wang, Yuning Mao, **Han Fang**, Marjan Ghazvininejad, Jiawei Han, Luke Zettlemoyer* · **ICLR** (2023)
- Improved adaptive algorithm for scalable active learning with weak labeler. *Yifang Chen, Karthik Sankararaman, Alessandro Lazaric, Matteo Pirotta, Dmytro Karamshuk, Qifan Wang, Karishma Mandyam, Sinong Wang, **Han Fang*** · arXiv (2022)
- Bayesformer: Transformer with uncertainty estimation. *Karthik Abinav Sankararaman, Sinong Wang, **Han Fang*** · arXiv (2022)
- Microestimates of wealth for all low-and middle-income countries. *Guanghua Chi, **Han Fang**, Sourav Chatterjee, Joshua E Blumenstock* · **PNAS** (2021)
- Reducing target group bias in hate speech detectors. *Darsh J Shah, Sinong Wang, **Han Fang**, Hao Ma, Luke Zettlemoyer* · arXiv (2021)
- Entailment as few-shot learner. *Sinong Wang, **Han Fang**, Madian Khabsa, Hanzi Mao, Hao Ma* · arXiv (2021)
- Linformer: Self-Attention with Linear Complexity. *Sinong Wang, Belinda Z Li, Madian Khabsa, **Han Fang**, Hao Ma* · arXiv (2020)

In PhD:

- Graphical and machine learning algorithms for large-scale genomics data. ***Han Fang*** · Dissertation (2017)
- Complex rearrangements and oncogene amplifications revealed by long-read DNA and RNA sequencing of a breast cancer cell line. *Maria Nattestad, Sara Goodwin, Karen Ng, Timour Baslan, Fritz J Sedlazeck, Philipp Rescheneder, Tyler Garvin, **Han Fang**, et al, W Richard McCombie, Michael C Schatz* · Genome Research (2018)
- Scikit-ribo enables accurate estimation and robust modeling of translation dynamics at codon resolution. ***Han Fang**, Yi-Fei Huang, Aditya Radhakrishnan, Adam Siepel, Gholson J Lyon, Michael C Schatz* · Cell Systems (2018)
- Whole genome sequencing of one complex pedigree illustrates challenges with genomic medicine. ***Han Fang**, Yiyang Wu, Hui Yang, Margaret Yoon, Laura T Jiménez-Barrón, David Mittelman, Reid Robison, Kai Wang,*

Gholson J Lyon · BMC Medical Genomics (2017)

- GenomeScope: fast reference-free genome profiling from short reads. *Gregory W Vurture, Fritz J Sedlazeck, Maria Nattestad, Charles J Underwood,* ***Han Fang****, James Gurtowski, Michael C Schatz* · Bioinformatics (2017)
- Accurate detection of complex structural variations using single molecule sequencing. *Fritz J Sedlazeck, Philipp Rescheneder, Moritz Smolka,* ***Han Fang****, Maria Nattestad, Arndt von Haeseler, Michael C Schatz* · Nature Method (2017)
- Indel variant analysis of short-read sequencing data with Scalpel. ***Han Fang****, Ewa A Grabowska, et al, Michael C Schatz, Giuseppe Narzisi* · Nature Protocols (2016)
- Reducing INDEL calling errors in whole genome and exome sequencing data. ***Han Fang****, Yiyang Wu, Giuseppe Narzisi, et al, Michael C Schatz, Gholson J Lyon* · Genome Medicine (2014)
- Accurate de novo and transmitted indel detection in exome-capture data using microassembly. *Giuseppe Narzisi, Jason A O'rawe, Ivan Iossifov,* ***Han Fang****, et al, Michael Wigler, Michael C Schatz* · Nature Methods (2014)

CONFERENCE

Platform Talk Presentations:

- *Meta AI: Building Meta's next gen AI experiences with Llama*
  Meta Connect Conference, Menlo Park, CA 2023
- *Tetris Planner: Optimizing Facebook Data Warehouse Data Placement*
  INFORMS Annual Meeting, Seattle, WA 2019
- *Machine Learning and graph partitioning for Facebook Data Warehouse*
  The Data Science Conference, Chicago, IL 2018
- *Scikit-ribo reveals precise codon-level translational control by dissecting ribosome pausing and codon elongation.*
  Biological Data Science Meeting, Cold Spring Harbor, NY 2016
- *Scikit-ribo reveals precise codon-level translational control by dissecting ribosome pausing and codon elongation.*
  Advances in Genome Biology and Technology(AGBT) Meeting, Orlando, FL 2016
- *Scikit-ribo: Accurate A-site prediction and robust modeling of translation control from Riboseq & RNAseq data.*
  Genome Informatics Meeting, Cold Spring Harbor, NY 2015
- *Reducing INDEL calling errors in whole genome and exome sequencing data.*
  Biological Data Science Meeting, Cold Spring Harbor, NY 2014

First-author Poster Presentations:

- *Scikit-ribo: Accurate estimation and robust modelling of translation dynamics at codon resolution*
  Biology of Genome Meeting, Cold Spring Harbor, NY 2017
- *Scikit-ribo reveals precise codon-level translational control by dissecting ribosome pausing and codon elongation.*
  Advances in Genome Biology and Technology(AGBT) Meeting, Hollywood, FL 2017
- *Scikit-ribo reveals precise codon-level translational control by dissecting ribosome pausing and codon elongation.*
  Genome Informatics Meeting, Cambridge, UK 2016
- *Scikit-ribo reveals precise codon-level translational control by dissecting ribosome pausing and codon elongation.*
  Translational control Meeting, Cold Spring Harbor, NY 2016
- *Scikit-ribo: Accurate A-site prediction and robust modeling of translation control from Riboseq & RNAseq data.*
  Probabilistic Modeling in Genomics Meeting, Cold Spring Harbor, NY 2015
- *Indel variant analysis of short-read sequencing data with Scalpel.* (*Reviewers' Choice*)
  American Society of Human Genetics Annual Meeting, Baltimore, MD 2015
- *Reducing INDEL calling errors in whole genome and exome sequencing data.*
  Personal Genomes Meeting, Cold Spring Harbor, NY 2014
- *Whole genome analysis of a pedigree with Prader-Willi syndrome, hereditary hemochromatosis, and dysautonomia.*
  Personal Genomes Meeting, Cold Spring Harbor, NY 2014
- *Reducing INDEL calling errors in whole genome and exome sequencing data.*
  American Society of Human Genetics Annual Meeting, San Diego, CA 2014
- *Complexities of INDEL detection based on micro-assembly methods; WGS and WES comparisons.*
  Biology of Genome Meeting, Cold Spring Harbor, NY 2014
- *Whole genome sequencing analysis of a family with familial dysautonomia and neuropsychiatric symptoms.*
  Personal Genomes Meeting, Cold Spring Harbor, NY 2013
- *The statistical properties of longitudinal phenotypes determined by trajectory models in linkage analysis*

Genetics Analysis Workshop 18, Stevenson, WA 2012

PROFESSIONAL ACTIVITIES

- 2021, ECML-PKDD, Program Committee
- 2019-Present, University of Washington Data Science Program, Industrial Advisory Board
- 2018-Present, The Data Science Conference (TDSC), Advisory Board
- 2018 International Conference on Computing and Information Systems (ICCIS), Program Committee
- 2018 International Conference on Intelligent Information Technologies (ICIIT), Reviewer
- 2018 International Conference on Research in Computational Molecular Biology (RECOMB), Reviewer
- 2017 Nucleic Acids Research (NAR), Reviewer
- 2017 Workshop on Algorithms in Bioinformatics (WABI), Reviewer
- 2016 MidSouth Computational Biology and Bioinformatics Society (MCBIOS), Reviewer