#### Selected Publications & Talks

Updated May 2023

The Comcast Applied AI Researchers are experts in their fields of study and are sought after to present at academic and industry conferences:

**Unveiling The Mask of Position-Information Pattern Through the Mist of Image Features**

Chieh Hubert Lin, Hsin-Ying Lee, Hung-Yu Tseng, Maneesh Singh, Ming-Hsuan Yan, ICML 2023 [[pdf]](https://arxiv.org/pdf/2206.01202.pdf)

**Simulating Humans at Scale to Evaluate Voice Interfaces for TVs: the Round-Trip System at Comcast.**

Breck Baldwin, Lauren Reese, LIming Zhang, Jan Neumann, Taylor Cassidy, Michael Pereira, G Craig Murray, Kishorekumar Sundararajan, Yidnekachew Endale, Pramod Kadagattor, Paul Wolfe, Brian Aiken, Tony Braskich, Donte Jiggetts, Adam Sloan, Esther Vaturi, Crystal Pender, Ferhan Ture, WSDM 2023[[pdf](https://ferhanture.com/Research_files/RoundTripWSDM_No_Bullets-3.pdf)][[link](https://dl.acm.org/doi/abs/10.1145/3539597.3575787)] [[video](https://dl.acm.org/action/downloadSupplement?doi=10.1145%2F3539597.3575787&file=wsdm2023_special_industry_day_ture_humans_01.mp4-streaming.mp4)]

**What the DAAM: Interpreting Stable Diffusion Using Cross Attention.**

Raphael Tang, Linqing Liu, Akshat Pandey, Zhiying Jiang, Gefei Yang, Karun Kumar, Pontus Stenetorp, Jimmy Lin, Ferhan Ture, ACL 2023 [[pdf](https://arxiv.org/abs/2210.04885)]

**Comcast SpeechNet: Weakly Supervised, End-to-End Speech Recognition at Industrial Scale.**

Raphael Tang, The Future of Data-Centric AI 2023 [[talk](https://future.snorkel.ai/)]

**SpeechNet: Weakly Supervised, End-to-End Speech Recognition at Industrial Scale.**

Raphael Tang, Karun Kumar, Gefei Yang, Akshat Pandey, Yajie Mao, Vladislav Belyaev, Madhuri Emmadi, Craig Murray, Ferhan Ture, Jimmy Lin, EMNLP 2022 [[pdf](https://aclanthology.org/2022.emnlp-industry.29/)]

**Learning to Rank Instant Search Results with Multiple Indices: A Case Study in Search Aggregation for Entertainment.**

Scott Rome, Sardar Hamidian, Richard Walsh, Kevin Foley, and Ferhan Ture, SIGIR 2022 [[pdf](https://ferhanture.com/Research_files/sirip44-romeCC-BY-NC-ND.pdf)]

**Temporal Early Exiting for Streaming Speech Commands Recognition.**

Raphael Tang, Karun Kumar, Ji Xin, Piyush Vyas, Wenyan Li, Gefei Yang, Yajie Mao, Craig Murray, Jimmy Lin, ICASSP 2022 [[pdf](https://cs.uwaterloo.ca/~jimmylin/publications/Tang_etal_ICASSP2022.pdf)]

**Voice Query Auto Completion.**

Raphael Tang, Karun Kumar, Kendra Chalkley, Ji Xin, Liming Zhang, Wenyan Li, Gefei Yang, Yajie Mao, Junho Shin, Geoffrey Craig Murray, Jimmy Lin, EMNLP 2021 [[pdf](https://aclanthology.org/2021.emnlp-main.68/)]

**VideoSSL: Semi-Supervised Learning for Video Classification.**

Longlong Jing, Toufiq Parag, Zhe Wu, Yingli Tian, Hongcheng Wang, WACV 2021 [[pdf](https://arxiv.org/abs/2003.00197)]

**Auto-annotation for Voice-enabled Entertainment Systems.**

Wenyan Li and Ferhan Ture. SIGIR 2020 [[pdf](http://ferhanture.com/Research_files/sigir2020_annotation.pdf)] [[presentation](http://ferhanture.com/Research_files/sigir2020-presentation.pptx)]

**Operationalizing Streaming Telemetry and Machine Learning Model Serving: Customer Experience Automation.** Nicholas Pinckernell, Scott Rome, SCTE: ISBE / NCTA Technical Papers, 2020 [[pdf](https://www.nctatechnicalpapers.com/Paper/2020/2020-operationalizing-streaming-telemetry-and-machine-learning-model-serving)]

**Video Activity Recognition for Smart Home Applications**

Embedded Vision Summit, Sept. 15, 2020

**Risk Minimization Under Sampling Bias Arising from Customer Interactions.**

Scott Rome and Michael Kreisel. In JSM Proceedings, Statistical Computing Section. Alexandria, VA: American Statistical Association. 2020

**Recommendation for New Users and New Items via Randomized Training and Mixture-of-Experts Transformation**. Ziwei Zhu, Shahin Sefati, Parsa Saadatpanah, James Caverlee. 43rd International ACM SIGIR conference on Research and Development in Information Retrieval (SIGIR), 2020 [[pdf](http://people.tamu.edu/~zhuziwei/pubs/Ziwei_SIGIR_2020_Cold.pdf)]

**Challenges and Opportunities in Understanding Spoken Queries Directed at Modern Entertainment Platforms.** Ferhan Ture, Jinfeng Rao, Raphael Tang, and Jimmy Lin. In Proc. of ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), 2019 [[pdf](http://users.umiacs.umd.edu/~fture/Research_files/Ture_etal_SIGIR2019.pdf)]

**Yelling at Your TV: An Analysis of Speech Recognition Errors and Subsequent User Behavior on Entertainment Systems.** Raphael Tang, Ferhan Ture, and Jimmy Lin. In Proc. of ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), 2019[[pdf](http://users.umiacs.umd.edu/~fture/Research_files/Tang_etal_SIGIR2019.pdf)]

**CX, Model Training Automation and the Feature Store Problem.** O’Reilly Strata Data Conference, Mumin Ransom, Nick Pinckernell. New York, NY. Sep 29, 2019 [[Link]](https://conferences.oreilly.com/strata/strata-ny/public/schedule/detail/77284)

**Layout-Induced Video Representation for Recognizing Agent-in-Place Actions,** Ruichi Yu, Hongcheng Wang, Ang Li, Jingxiao Zheng, Vlad I. Morariu and Larry Davis, International Conference on Computer Vision (ICCV), Seoul, South Korea, Oct. 2019 [[link](https://comcastcorp.sharepoint.com/%3Ab%3A/r/sites/AppliedAI/Shared%20Documents/Meetings%20%26%20Talks/External%20Talks/ICCV2019_LIVR.pdf?csf=1&e=DCWhPi)]

**Enhancing Customer experience with xFinity home intelligence,** Hongcheng Wang, Philadelphia Artificial Intelligence and Machine Learning (PHLAI), Aug. 15, 2019 [[link](https://comcastcorp.sharepoint.com/%3Ap%3A/r/sites/AppliedAI/Shared%20Documents/Meetings%20%26%20Talks/External%20Talks/190815_PHLAI_Hongcheng_XH.pptx?d=w4073490a5a7240c7bd9568ce528e2b06&csf=1&e=0cwvL1)]

# **End-to-end ML streaming with Kubeflow, Kafka, and Redis at scale.** OSCON, Nick Pinckernell. Portland, OR. Jul 16, 2019 [[Link]](https://conferences.oreilly.com/oscon/oscon-or-2019/public/schedule/detail/79363)

**How to Utilize MLflow and Kubernetes to Build an Enterprise ML Platform.** Spark+AI Summit . Nicholas Pinckernell. San Francisco, CA, Apr 25, 2019 [[Link]](https://databricks.com/sparkaisummit/north-america/sessions-single-2019?id=172)

**Winning the Audience with AI: Comcast’s Journey to Building an Agile Data and AI Platform at Scale.** Spark+AI Summit Keynote. Jim Forsythe & Jan Neumann. San Francisco, CA, Apr 25, 2019 [[Video]](https://databricks.com/sparkaisummit/north-america/2019-spark-summit-ai-keynotes-2)

**AI’s Role in re-inventing the Customer Experience. Jan Neumann.** Future of Technology Summit. Washington, DC. Apr 9, 2019 [[Link]](https://www.ftsummit.us/agenda/)

**How AI Allows Comcast to Reinvent the Customer Experience.** Jan Neumann. GWSB Center for the Connected Consumer Inaugural Conference on the Intelligence of Things, Washington, DC, Apr 5, 2019 [[Link](https://postsocial.gwu.edu/gw-inaugural-conference-on-the-intelligence-of-things/)]

**Enabling Deep Discovery and Navigational Experiences with Voice and AI-Driven Media Analytics.** Jan Neumann, GPU Technology Conference (GTC), San Jose, CA, Mar 19, 2019

**Enabling Deep Discovery and Navigational Experiences with AI-Driven Media Analytics.** Faisal Ishtiaq & Jan Neumann, Media Insights and Engagements Conference, Los Angeles, CA, Jan 29, 2019 [[Link]](https://marketing.knect365.com/media-insights/)

**TV and Movie Recommendations: The Comcast Case.** Shahin Sefati, Jan Neumann, Hassan Sayyadi, Book Chapter, Collaborative Recommendations, pp. 465-479, 2018.

**Conversational Content Discovery via Comcast X1 Voice Interface.** Shahin Sefati, Parsa Saadatpanah, Hassan Sayyadi, Jan Neumann, In Proceedings of the 12th ACM Conference on Recommender Systems, pp. 489-489, Vancouver, Canada, 2018. [[video](https://www.youtube.com/watch?v=z8vMFo0kYw4)]

**Deep Learning for Smart Home Monitoring.** Hongcheng Wang, GPU Technical Conference (GTC), Washington, D.C., Oct. 23-24, 2018 [[Link](https://gtcwashingtondc2018.smarteventscloud.com/connect/sessionDetail.ww?SESSION_ID=230111)]

**Using AI to Improve the Customer Experience.** Bernard Burg, SCTE-ISBE CABLE-TEC EXPO 2018, Oct. 22-25, Atlanta, GA

**How Comcast uses AI to reinvent the customer experience.** Jan Neumann. CableLabs Summer Conference, Keystone, CO, August 7th, 2018

**Multi-Perspective Relevance Matching with Hierarchical ConvNets for Social Media Search.** Jinfeng Rao, Wei Yang, Yuhao Zhang, Ferhan Ture, and Jimmy Lin. In Proc. of Association for the Advancement of Artificial Intelligence (AAAI), 2019[[pdf](https://arxiv.org/pdf/1805.08159.pdf)]

**Multi-Task Learning with Neural Networks for Voice Query Understanding on an Entertainment Platform.** Jinfeng Rao, Ferhan Ture, and Jimmy Lin, In Proc. of International Conference on Knowledge Discovery & Data Mining (KDD), 2018 [[pdf](http://legacydirs.umiacs.umd.edu/~fture/Research_files/nn-models.pdf)]

**How Voice helps Comcast to reinvent the customer experience.** Jeanine Heck & Jan Neumann, VOICE Summit, Newark, NJ, July 2018, [[Video]](https://www.youtube.com/watch?v=kw19PCRykSI&t=0s)

**What Do Viewers Say to Their TVs? An Analysis of Voice Queries to Entertainment Systems.** Jinfeng Rao, Ferhan Ture, and Jimmy Lin, In Proc. of ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2018). [[pdf](http://legacydirs.umiacs.umd.edu/~fture/Research_files/voice-log-analysis.pdf)]

**Representing Videos based on Scene Layouts for Recognizing Agent-in-Place Actions.** Ruichi Yu, Hongcheng Wang, Ang Li, Jingxiao Zheng, Vlad I. Morariu and Larry Davis, arXiv:1804.01429 [cs.CV] [[PDF]](https://arxiv.org/pdf/1804.01429.pdf)

**Architecting a Smart Home Monitoring System with Millions of Cameras.** HongchengWang, Embedded Vision Summit, Santa Clara, CA, May 22, 2018 [[Link]](https://www.embedded-vision.com/summit/architecting-smart-home-surveillance-system-millions-cameras)

**How Comcast uses AI to reinvent the customer experience.** Jan Neumann & Dominique Izbicki. AI Conference NYC, May 1st, 2018. [[Link]](https://conferences.oreilly.com/artificial-intelligence/ai-ny/public/schedule/detail/65109)

**Deep Residual Learning for Small-Footprint Keyword Spotting.** Raphael Tang and Jimmy Lin. ICASSP 2018. [[Link]](https://cs.uwaterloo.ca/~jimmylin/publications/Tang_Lin_ICASSP2018.pdf)

**How Comcast Uses Deep Learning to Build Intelligent Products and Applications.** Jan Neumann. Nvidia GPU Technology Conference, San Jose, CA, March 2018 [[Link]](https://2018gputechconf.smarteventscloud.com/connect/sessionDetail.ww?SESSION_ID=151354)

**ReMotENet: Efficient Relevant Motion Event Detection for Large-scale Home Surveillance Videos.** Ruichi Yu, Hongcheng Wang and Larry Davis, IEEE WACV, Stateline, NV, arXiv:1801.02031, 2018 [[PDF]](https://arxiv.org/pdf/1801.02031.pdf)

**Talking to Your TV: Context-Aware Voice Search with Hierarchical Recurrent Neural Networks.** Jinfeng Rao, Ferhan Ture, Hua He, Oliver Jojic, and Jimmy Lin, In Proc. of International Conference on Information and Knowledge Management (CIKM 2017)

**No Need to Pay Attention: Simple Recurrent Neural Networks Work! (for Answering “Simple” Questions),** Ferhan Ture and Oliver Jojic, In Proc. of Empirical Methods in NLP (EMNLP 2017)

**Integrating Lexical and Temporal Signals in Neural Ranking Models for Searching Social Media Streams.** Jinfeng Rao, Hua He, Haotian Zhang, Ferhan Ture, Royal Sequiera, Salman Mohammed, and Jimmy Lin, To appear in SIGIR 2017 Workshop on Neural Information Retrieval (Neu-IR’17) [[pdf](https://arxiv.org/pdf/1707.07792.pdf)]

**Mining Temporal Statistics of Query Terms for Searching Social Media Posts.** Jinfeng Rao, Ferhan Ture, Xing Niu and Jimmy Lin, To appear in International Conference on the Theory of Information Retrieval (ICTIR 2017)

**How AI Powers the Comcast X1 Voice Interface**, Jan Neumann, Ferhan Ture & Oliver Jojic, O’Reilly AI Conference, June 2017, New York NY [[Conference link](https://conferences.oreilly.com/artificial-intelligence/ai-ny/public/schedule/detail/59148)]

**Data Science & Machine Learning to Improve the Customer Experience,** Jan Neumann, Business Analytics Innovation Summit,May 2017, Chicago,IL [[Conference Schedule](https://theinnovationenterprise.com/summits/business-analytics-innovation-summit-chicago-2017/schedule)]

**How GPUs Power Comcast’s X1 Voice Remote and Smart Video Analytics**, Jan Neumann, GPU Technology Conference, May 2017, San Jose, CA [[Conference Link](https://www.nvidia.com/en-us/gtc/sessions/media-and-entertainment/)]

**How AI Powers the X1 Entertainment System.** Jan Neumann, AI Summit NYC, Dec 2016, New York, NY [[Conference web site](https://theaisummit.com/newyork/)]

**Learning to Translate for Multilingual Question Answering.** Ferhan Ture and Elizabeth Boshee, 2016 Conference on Empirical Methods in Natural Language Processing, Austin, TX [[PDF]](http://aclweb.org/anthology/D/D16/D16-1055.pdf)

[**3rd Workshop on Recommender Systems for TV and Online Video (RecSysTV 2016)**](http://dclabs.comcast.com/research/recsystv2016/)**organized by Jan Neumann, John Hannon, and Hassan Sayyadi in conjunction with ACM RecSys 2016, Boston, MA**

**Ask Your TV: Real-Time Question Answering with Recurrent Neural Networks.** Ferhan Ture and Oliver Jojic, SIGIR 2016, Pisa, Italy [[ACM DL]](http://dl.acm.org/citation.cfm?id=2926729&dl=ACM&coll=DL&CFID=862962402&CFTOKEN=97770244) [[Arxiv pdf]](https://arxiv.org/abs/1606.05029)

**Learning Temporal Regularity in Video Sequences.** Mahmudul Hasan, Jonghyun Choi, Jan Neumann, Amit K. Roy-Chowdhury, Larry S. Davis, CVPR 2016. [[PDF]](http://www.umiacs.umd.edu/~jhchoi/paper/cvpr2016_anomaly.pdf) [[Supplementary]](http://www.umiacs.umd.edu/~jhchoi/paper/cvpr2016_anomaly_supp.pdf) [[Project Page]](http://www.ee.ucr.edu/~mhasan/regularity.html) [[Code]](https://github.com/mhasa004/caffe) [[Video1]](https://www.youtube.com/watch?v=RQ7dg6wCrQc) [[Video2]](https://www.youtube.com/watch?v=UXEndaBFq6s) [[Poster]](http://www.umiacs.umd.edu/~jhchoi/paper/cvpr2016_anomaly_poster.pdf)arXiv:1604.04574 [[PDF-Preprint]](http://arxiv.org/abs/1604.04574)

**How to Fake Multiply with a Gaussian Matrix.** Michael Kapralov, Vamsi K. Potluru and David P. Woodruff, ICML 2016. ([paper](http://jmlr.org/proceedings/papers/v48/kapralov16.html), [code](https://github.com/marinkaz/nimfa/), [arxiv](https://arxiv.org/abs/1606.05732))

**Structured TV Shows — “You have been Chopped”.** Ferhan Ture, Jonghyun Choi, Hongcheng Wang and Vamsi K. Potluru, ICML workshop 2016. ([pdf](http://www.vamsi.guru/papers/icml-chopped-2016.pdf))

[**Data Science and Machine Learning to Improve the Customer Experience.**](https://theinnovationenterprise.com/summits/business-analytics-innovation-summit-chicago-2016/speakers/12648) **Jan Neumann, Business Analytics Summit – Innovation Enterprise, Chicago, IL, May 2016**

[**How Automatic Content Analytics enables the TV Experiences of the Future.**](https://www.intxshow.com/session/1027/) **Jan Neumann, INTX 2016, Boston, MA**

[**How Comcast Uses Data Science and ML to Improve the Customer Experience.**](https://www.infoq.com/presentations/comcast-big-data-ml) **Jan Neumann, Global Big Data Conference March 2016, Santa Clara, US**

**Knowledge Transfer with Interactive Learning of Semantic Relationships.** Jonghyun Choi, Sung Ju Hwang, Leonid Sigal and Larry S. Davis,
AAAI Conference on Artificial Intelligence (AAAI) 2016 ([PDF](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj3r8KP-pjLAhXHbiYKHQebDXAQFggiMAA&url=http%3A%2F%2Fwww.umiacs.umd.edu%2F~jhchoi%2Fpaper%2Faaai2016_sal.pdf&usg=AFQjCNGS-SRbyWpbfSiC2XGV24sAqGdJ_w&sig2=j_H8Gy-pNj5q3yMLG7_Scw))

[**How Spark is working out at Comcast Scale**](http://conferences.oreilly.com/strata/big-data-conference-ny-2015/public/schedule/detail/43144)**.** Sridhar Alla and Jan Neumann, Strata Hadop NYC 2015

[**Recommendations for Live TV**](https://recsys.acm.org/recsys15/industry-session-1/#content-tab-1-1-tab)**.** Jan Neumann and Hassan Sayyadi, RecSys 2015, Vienna Austria

[**2nd Workshop on Recommender Systems for TV and Online Video (RecSysTV 2015)**](http://www.contentwise.tv/recsystv2015/)**organized by Jan Neumann, Hassan Sayyadi, John Hannon, Roberto Turrin, and Danny Bickson in conjunction with ACM RecSys 2015, Vienna, Austria**

[**Data Science for Customer Service at Comcast**](http://conf.dato.com/2015/speakers/dr-jan-neumann/)**.** Jan Neumann, Dato Data Science Summit, San Francisco 2015 ([Video](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0ahUKEwj-m8nlxL7KAhXEMj4KHZytAEgQtwIIKzAF&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DjXlmIb6zz38&usg=AFQjCNEsCnTPt8do_lG2Ms1lZ1JuPQJ01A&sig2=Phrh9EAgKf-w6Aj-0IJNDQ&bvm=bv.112454388,d.cWw))

[**Comcast – Real-time Recommendations with Spark**](http://www.meetup.com/Washington-DC-Area-Spark-Interactive/events/221596490/)**.** Jan Neumann, DC Spark Interactive Meetup, Washington, DC, May 2015 ([Video](https://www.youtube.com/watch?v=a_HF4kN0hZc))

[**Real-time Recommendations using Apache Spark**](https://spark-summit.org/east-2015/talk/real-time-recommendations-using-spark)**.** Jan Neumann & Sirdhar Alla, Spark Summit East 2015 ([Video](https://www.youtube.com/watch?v=cg8lm7ANxkA))

[**1st Workshop on Recommender Systems for TV and Online Video (RecSysTV 2014)**](http://videogeometry.com/recsystv-2014-program/)**organized by Jan Neumann, Hassan Sayyadi, John Hannon, Roberto Turrin, and Danny Bickson in conjunction with ACM RecSys 2014, Foster City, USA**

[**A probabilistic definition of item similarity**](http://dx.doi.org/10.1145/2043932.2043973)**.** Oliver Jojic, Manu Shukla and Niranjan Bhosarekar. ACM Recsys 2011, Chicago, IL, USA. [[pdf](http://dclabs.comcast.com/wp-content/uploads/2018/09/p229-jojic.pdf)]