

Taesup Moon

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EDUCATION

Stanford University, Stanford, CA, USA

- Doctor of Philosophy (Ph.D.) in Electrical Engineering Jun 2004 – Sep 2008
 - Thesis: Learning from noisy data with applications to filtering and denoising
 - Advisor: Prof. Tsachy Weissman
 - Committee: Prof. Thomas M. Cover, Prof. Abbas El Gamal
- Master of Science (M.S.) in Electrical Engineering Sep 2002 – Jun 2004
 - Cumulative GPA: 4.0 / 4.0

Seoul National University, Seoul, Korea

- Bachelor of Science (B.S.) in Electrical Engineering Mar 1996 – Feb 2002
 - *Summa Cum Laude*
 - Cumulative GPA: 3.92 / 4.30

WORK

EXPERIENCE

Daegu-Gyeongbuk Institute of Science and Technology (DGIST), Daegu, Korea

- Assistant Professor, Department of Information and Communication Engineering Sep 2015 –
 - Principal Investigator of M.IN.D. Laboratory (<http://mind.dgist.ac.kr>)
 - Research areas: **machine learning (deep learning)**, **data science**, **signal processing**, **statistical learning theory**, information theory, optimization
 - Current Projects: Neural network based universal denoising, Distributed bootstrap for model selection, DNA data analyses, Object detection using radar sensors, Non-intrusive load monitoring (NILM), Fast and accurate PM2.5 estimation, Predictive medical data analyses

Samsung Advanced Institute of Technology (SAIT), Suwon, Korea

- Research Staff Member, Software Solution Laboratory Sep 2013 – Aug 2015
 - Project: **Next generation speech recognition** - devised RNNDrop algorithm to train deep recurrent neural networks. The deep bidirectional LSTM based acoustic model trained with RNNDrop outperformed the state-of-the-arts by more than 10% on benchmark datasets like TIMIT or WSJ corpus. The result of this project was pushed into several Samsung products, e.g., Galaxy smartphones and Smart TVs.
 - Project: **Real-time scene understanding for self-driving cars** - led a team (5 people) on developing a novel real-time perception algorithm (based on deep learning and computer vision) for self-driving cars.
 - Project: **Samsung headquarter task-force (TF) team on smart car technology** - participated in the headquarter TF team (for 3 months) involving representatives from each division of Samsung (LSI, Display, SERI, SAIT, SEM, SEC) and extensively analyzed the smart car technology and industry to identify future business opportunities.

University of California at Berkeley, Berkeley, CA, USA

- Postdoctoral Scholar, Department of Statistics Feb 2012 – Aug 2013
 - Advisor: Prof. Bin Yu
 - Project: **Aerosol retrieval via statistical modeling and remote sensing** - developed statistical model-based high-resolution aerosol retrieval algorithm using satellite-based multi-spectral data.
 - Projects: **Distributed bootstrap based model selection** - developed efficient alternative to the cross-validation (CV) for high-dimensional data.

Yahoo! Labs, Sunnyvale, CA, USA

- Scientist, Search Science Team Oct 2008 – Jan 2012
 - Project: **Machine-learned ranking for web search** - devised a supervised machine learning based ranking scheme for web search engine using convex optimization and stochastic gradient boosting methods.
 - Project: **Online learning for real-time re-ranking** - devised a scheme that adjusts rankings real-time based on contextual bandit algorithms. The algorithm quickly adjusts ranking by observing users' click feedback and shows benefit over traditional batch-trained ranking function for search queries with time-varying relevance.
 - Project: **Learning relatedness for news recommendation** - defined *relatedness*, which is different from similarity, for news recommendation and devised a machine-learned relatedness function for a pair of news articles by combining information retrieval-based features.
 - Other projects: User behavior model based ranking, Personalized content recommendation

PUBLICATIONS

MANUSCRIPTS UNDER REVIEW

- [1] Byunghan Lee, **Taesup Moon (co-corresponding author)**, Sungroh Yoon, and Tsachy Weissman, “DUDE-Seq: Fast, flexible, and robust denoising for targeted amplicon sequencing,” submitted to *PLoS Computational Biology*

JOURNALS

- [10] Jinhee Park, Rios Jesus Javier, **Taesup Moon (corresponding author)**, and Youngwook Kim, “Micro-Doppler based classification of human aquatic activities via transfer learning of convolutional neural networks,” *Sensors*, vol.16, no.12, pp.1990, November 2016
- [9] Taehoon Lee, **Taesup Moon**, Seung Jean Kim, and Sungroh Yoon, “Regularization and kernelization of the maximin correlation approach,” *IEEE Access*, vol. 4, pp. 1385-1392, April 2016
- [8] Youngwook Kim and **Taesup Moon (corresponding author)**, “Human detection and activity classification based on micro-Dopplers using deep convolutional neural networks,” *IEEE Geoscience and Remote Sensing Letters*, vol. 13, no.1, pp.8–12, January 2016 (**3rd most downloaded paper of IEEE GRSL in Aug 2016 and July 2016.**)
- [7] **Taesup Moon (corresponding author)**, Yueqing Wang, Yang Liu and Bin Yu, “Evaluation of a MISR-based high-resolution aerosol retrieval method using AERONET DRAGON campaign data,” *IEEE Transactions on Geoscience and Remote Sensing*, vol.53, no.8, pp.4328–4339, August 2015
- [6] Jiang Bian, Bo Long, Lihong Li, **Taesup Moon**, Anlei Dong, and Yi Chang, “Exploiting User Preference for Online Learning in Recommender Systems,” *ACM Transactions on Intelligent Systems and Technology*, vol.5, no.2, pp.33:1–23, April 2014
- [5] **Taesup Moon (corresponding author)**, Wei Chu, Lihong Li, Zhaohui Zheng, and Yi Chang, “An online learning framework for refining recency search results with user click feedback”, *ACM Transactions on Information Systems*, vol.30, no.4, pp.20:1-28, November 2012
- [4] **Taesup Moon (corresponding author)**, “Universal Switching FIR Filtering,” *IEEE Transactions on Signal Processing*, vol.60, no.3, pp.1460-1464, March 2012
- [3] **Taesup Moon** and Tsachy Weissman, “Discrete denoising with shifts,” *IEEE Transactions on Information Theory*, vol. 55, no.11, pp.5284–5301, November 2009
- [2] **Taesup Moon** and Tsachy Weissman, “Universal FIR MMSE filtering,” *IEEE Transactions on Signal Processing*, vol.57, no.3, pp.1068-1083, March 2009
- [1] **Taesup Moon** and Tsachy Weissman, “Universal filtering via hidden Markov modeling,” *IEEE Transactions on Information Theory*, vol.54, no.2, pp.692–708, February 2008

CONFERENCE PROCEEDINGS

- [12] **Taesup Moon (corresponding author)**, Seonwoo Min, Byunghan Lee, and Sungroh Yoon, “Neural universal discrete denoiser”, *Proceedings of Neural Information Processing System (NIPS)*, December 2016 (**BK Conference Code: BKCS0010, Acceptance rate: 568/2500=22.7%, Top conference in Machine Learning**)
- [11] Youngwook Kim and **Taesup Moon (corresponding author)**, “Classification of human activity on water through micro-Dopplers using deep convolutional neural networks”, *Proceedings of SPIE 9829, Radar Sensor Technology XX, 982917*, May 2016
- [10] **Taesup Moon (corresponding author)**, Heeyoul Choi, Hoshik Lee, and Inchul Song, “RNNDrop: A novel dropout for RNNs in ASR”, *Proceedings of 2015 IEEE Automatic Speech Recognition and Understanding (ASRU) Workshop*, December 2015 (**BK Conference Code: BKCS0107, Google Scholar citation:6**)
- [09] Lihong Li, Wei Chu, John Langford, **Taesup Moon**, and Xuanhui Wang, “An unbiased offline evaluation of contextual bandit algorithms with generalized linear models”, *Journal of Machine Learning Research - Workshop and Conference Proceedings 26: On-line Trading of Exploration and Exploitation 2*, pp.19-36, May, 2012
- [08] **Taesup Moon (corresponding author)**, Tsachy Weissman, and Jae-Young Kim, “Discrete denoising of heterogeneous two-dimensional data,” *Proceedings of 2011 IEEE International Symposium on Information Theory (ISIT)*, St. Petersburg, Russia, August 2011
- [07] Yuanhua Lv, **Taesup Moon**, Pranam Kolari, Zhaohui Zheng, Xuanhui Wang, and Yi Chang, “Learning to model relatedness for news recommendation”, *Proceedings of 20th International World Wide Web (WWW) Conference*, Hyderabad, India, March 2011 (**BK Conference Code: BKCS0025, Google Scholar citation:58**)

- [06] **Taesup Moon (corresponding author)**, Shihao Ji, Georges Dupret, Ciya Liao, and Zhaohui Zheng, “User behavior driven ranking without editorial judgments,” *Proceedings of ACM International Conference on Information and Knowledge Management (CIKM)*, Toronto, Canada, October 2010 (**BK Conference Code: BKCS0027, Google Scholar citation:6**)
- [05] **Taesup Moon (corresponding author)**, Lihong Li, Wei Chu, Zhaohui Zheng, and Yi Chang, “Online learning for recency search ranking using real-time user feedback,” *Proceedings of ACM International Conference on Information and Knowledge Management (CIKM)*, Toronto, Canada, October 2010 (**BK Conference Code: BKCS0027, Google Scholar citation:23**)
- [04] **Taesup Moon (corresponding author)**, Alex Smola, Yi Chang, and Zhaohui Zheng, “IntervalRank - Isotonic regression with listwise and pairwise constraints,” *Proceedings of ACM International Conference on Web Search and Data Mining (WSDM)*, New York, NY, February 2010 (**BK Conference Code: BKCS0072, Google Scholar citation:28**)
- [03] **Taesup Moon (corresponding author)** and Tsachy Weissman, “Discrete denoising with shifts,” *Proceedings of 45th Annual Allerton Conference on Communication, Control, and Computation*, Monticello, Illinois, September 2007
- [02] **Taesup Moon (corresponding author)** and Tsachy Weissman, “Competitive on-line linear FIR MMSE filtering,” *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, Nice, France, June 2007
- [01] **Taesup Moon (corresponding author)** and Tsachy Weissman, “Discrete universal filtering via hidden Markov modeling,” *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, Adelaide, Australia, September 2005

**RECENT TALKS
(SELECTED)**

- Invited Talk on “Neural Universal Discrete Denoiser”
 - *DGIST Global Innovation Festival (DGIF) 2016* Nov 2016
 - *Korea-Japan Database Workshop (KJDB) 2016* Nov 2016
 - *POSTECH CSE Seminar Series (Invited by Prof. Bohyung Han)* Jun 2016
 - *Information Theory Forum, Stanford University (Invited by Prof. Tsachy Weissman)* Apr 2016
- Tutorial on “Deep Learning”
 - *IEMEK (Institute of Embedded Engineers of Korea) Fall Symposium* Nov 2016
 - *KIISE (Korean Institute of Information Scientists and Engineers) Winter Conference* Dec 2015
 - *KSS (Korean Statistical Society) Fall Symposium* Nov 2015
 - *IEIE (Institute of Electronics and Information Engineers) Summer Conference* Jun 2015
- Guest lecture on “Fundamentals on Machine Learning”
 - *KICS Information Theory Summer School* Aug 2016
- Tutorial on “Deep Learning and Machine Vision”
 - *IEIE Workshop on Artificial Intelligence and Brain-Inspired HW Framework* Jul 2016
- 8 Extensive Seminars on “Deep Learning for Computer Vision and NLP”
 - *Samsung Software R&D Center (Invited by VP Hong-Seok Kim)* Oct 2015–Dec 2015

**PATENTS &
DEFENSIVE
PUBLICATIONS**

- [4] **Taesup Moon**, Yeha Lee, and Heeyoul Choi, “Neural network training method and apparatus, and data processing apparatus” [US Patent Application 20160026913 A1](#), Jan 2016
- [3] **Taesup Moon**, Zhaohui Zheng, Yi Chang, Pranam Kolari, Xuanhui Wang, and Yuanhua Lv, “Related news articles”, [US Patent US20130132401 A1](#), May 2013
- [2] Jiang Bian, Bo Long, Lihong Li, **Taesup Moon**, Anlei Dong, and Yi Chang, “A method of using a pairwise learning model in an online recommendation system”, IP.com Prior Art Database Disclosure, [Disclosure Number IPCOM000216302D](#), March 2012
- [1] **Taesup Moon**, Wei Chu, Lihong Li, Zhaohui Zheng, and Yi Chang, “Method and system of online learning for recency search ranking using real-time user feedback,” IP.com Prior Art Database Disclosure, [Disclosure Number IPCOM000203007D](#), January 2011

TEACHING EXPERIENCE	<ul style="list-style-type: none"> ▪ IC605: Algorithms (Deep Learning) Sep 2016–Dec 2016 A graduate level course on deep learning based visual recognition and language understanding (Equivalent to <i>Stanford CS231n:Convolutional Neural Networks for Visual Recognition</i>) ▪ SE361: Data Structures and Algorithms Mar 2016–Jun 2016 An undergraduate level course on data structures and algorithms (Co-taught with Prof. Min-Soo Kim) ▪ IC669: Introduction to Machine Learning Mar 2016–Jun 2016 A graduate/undergraduate level introductory course on Machine Learning ▪ IC566: Statistical Signal Processing Sep 2015–Dec 2015 A graduate level course on random process and statistical signal processing
RESEARCH GRANTS	<p>NRF Young Researcher Program Jun 2016 –May 2019</p> <ul style="list-style-type: none"> ▪ “A novel deep learning based framework for denoising and estimation” (Total funding: 300 Million KRW / 3 years) <p>MSIP-DGIST Funding Jan 2017 –Dec 2021</p> <ul style="list-style-type: none"> ▪ “AI and computer vision based object detection & tracking using low altitude radar sensors” (Total funding: 300 Million KRW / 5 years) <p>Encored Technologies, Inc. Consulting Project Oct 2016 –Sep 2017</p> <ul style="list-style-type: none"> ▪ “Deep learning based non-intrusive load monitoring (NILM)” (Total funding: 25 Million KRW / 1 year)
PROFESSIONAL ACTIVITIES	<p>Member, IEEE Oct 2008 – Oct 2016</p> <p>PC Member, AAAI 2017</p> <p>Reviewer, NIPS, ICML, ISIT, CSDA, IEEE Trans. on Inform. Theory, IEEE Trans. on Sig. Process., IEEE Trans. on Image Process., Biometrika, Applied Intelligence, Sensors</p>
HONORS	<p>Samsung Scholarship Sep 2004 –Sep 2008</p> <ul style="list-style-type: none"> ▪ One of 25 Korean PhD candidate annual awardees studying abroad <p>Korean Foundation for Advanced Studies Sep 2002 –Aug 2004</p> <ul style="list-style-type: none"> ▪ One of 10 Korean MS/PhD candidate annual awardees studying Engineering abroad <p>AT&T Asia Pacific Leadership Award 2002 Nov 2002</p> <ul style="list-style-type: none"> ▪ One of 30 annual awardees from across Asia-Pacific region <p>General Electric (GE) scholarship Mar 1998 –Feb 2002</p> <ul style="list-style-type: none"> ▪ One of 2 annual awardees studying Electrical Engineering in Korea
SKILLS	<p>Computers</p> <ul style="list-style-type: none"> ▪ Deep learning open source tools: Theano, Caffe, Tensorflow ▪ Python, C/C++, CUDA, MATLAB, Hadoop, UNIX Shell, Pig, Perl, R <p>Language</p> <ul style="list-style-type: none"> ▪ English (fluent), Korean (native)
REFERENCES	<ul style="list-style-type: none"> ▪ Professor Tsachy Weissman Department of Electrical Engineering Stanford University, Stanford, CA, USA tsachy@stanford.edu • +1 (650) 736-1418 ▪ Professor Bin Yu Department of Electrical Engineering and Computer Science / Department of Statistics University of California at Berkeley, Berkeley, CA, USA binyu@stat.berkeley.edu • +1 (510) 642-2021 ▪ Professor Alex Smola Department of Machine Learning Carnegie Mellon University, Pittsburgh, PA, USA alex@smola.org • +1 (408) 759-1044