

# Daewon Seo

Assistant Professor  
Electrical Engineering and Computer Science  
DGIST

dwseo@dgist.ac.kr  
<https://dae-won-seo.github.io>  
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## Research Interests

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My research interests lie broadly in theory of communications and machine learning.

## Education

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Ph.D. in Electrical & Computer Engineering, Aug. 2014–Aug. 2019

University of Illinois at Urbana-Champaign, IL, USA

Advisor: Lav R. Varshney

Thesis: Information-theoretic analysis of human-machine mixed systems

Thesis Committee: Lav R. Varshney, Pierre Moulin, Rayadurgam Srikant, Venugopal V. Veeravalli

M.S. in Electrical Engineering, Feb. 2010

KAIST (Korea Advanced Institute of Science and Technology), Daejeon, South Korea

Advisor: Sae-Young Chung, Junmo Kim (co-advisor)

Thesis: Achievable schemes on Z-interference channels with finite conferencing link

Thesis Committee: Sae-Young Chung, Junmo Kim, Jeongseok Ha

B.S. in Electrical Engineering (*summa cum laude*), Feb. 2008

KAIST (Korea Advanced Institute of Science and Technology), Daejeon, South Korea

Advisor: Sae-Young Chung

## Work Experience

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DGIST, Daegu, South Korea, Aug. 2021–present

- Assistant Professor, EECS Dept.

University of Wisconsin–Madison, WI, USA, Jan. 2020–July 2021

- Postdoctoral Researcher, hosted by Prof. Kangwook Lee
- Deep learning theory / GANs

University of Southern California, CA, USA, Sep. 2019–Dec. 2019

- Postdoctoral Researcher, hosted by Prof. Urbashi Mitra
- Mathematical modeling for microbiology / Molecular communication

LG Electronics, Seoul, South Korea, Oct. 2011–May 2014

- 3GPP LTE-Advanced RAN1 (physical) standardization

KAIST Institute, Daejeon, South Korea, Mar. 2010–Sep. 2011

- Near-field communication HW and SW / Wireless power transfer systems

## Publications

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### *Preprints / Submitted*

- [Pre1] **Daewon Seo**, Sung-Hoon Lim, “Integrated Communication and Binary State Detection from Hoeffding’s Perspective,” The 22nd International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks (WiOpt), submitted
- [Pre1] Hansung Choi, **Daewon Seo**, “Deep Minimax Classifier for Imbalanced Datasets with Small Number of Minority Sample,” IEEE Journal of Selected Topics in Signal Processing, submitted
- [Pre2] **Daewon Seo**, Sung-Hoon Lim, “On the Fundamental Tradeoff of Joint Communication and Quickest Change Detection,” IEEE Transactions on Communications, submitted

### *Journal Articles*

- [J1] **Daewon Seo**, Sung Hoon Lim, Yongjune Kim, “A Context-aware CEO Problem,” IEEE Transactions on Communications, vol. 71, no. 12, pp. 6979–6992, December 2023 ([Link](#))
- [J2] **Daewon Seo**, Youngjune Kim, “Information and Energy Transmission with Wavelet-Reconstructed Harvesting Functions,” IEEE Transactions on Communications, vol. 71, no. 6, pp. 3274–3287, June 2023 ([Link](#))
- [J3] Sourya Basu, **Daewon Seo**, Lav R. Varshney, “Hypergraph-based Source Codes for Function Computation Under Maximal Distortion,” IEEE Journal on Selected Areas in Information Theory, vol. 3, no. 4, pp. 824–838, December 2022 ([Link](#))
- [J4] **Daewon Seo**, Ravi Kiran Raman, Lav R. Varshney, “Decision Making in Star Networks with Incorrect Beliefs,” IEEE Transactions on Signal Processing, vol. 69, pp. 6221–6236, 2021 ([Link](#))
- [J5] Mustafa Can GURSOY, **Daewon Seo**, Urbashi Mitra, “A Concentration-Time Hybrid Modulation Scheme for Molecular Communications,” IEEE Transactions on Molecular, Biological, and Multi-scale Communications, vol. 7, no. 4, pp. 288–299, December 2021 ([Link](#))
- [J6] **Daewon Seo**, Lav R. Varshney, “The CEO problem with  $r$ th Power of Difference and Logarithmic Distortions,” IEEE Transactions on Information Theory, vol. 67, no. 6, pp. 3873–3891, June 2021 ([Link](#))
- [J7] **Daewon Seo**, Avhishek Chatterjee, Lav R. Varshney, “On Multiple-Access in Queue-Length Sensitive Systems,” IEEE Open Journal of the Communications Society, vol. 1, pp. 1244–1255, August 2020 ([Link](#))
- [J8] **Daewon Seo**, Anas Chaaban, Lav R. Varshney, Mohamed-Slim Alouini, “Classes of Full-Duplex Channels with Capacity Achieved Without Adaptation,” IEEE Transactions on Communications, vol. 68, no. 7, pp. 4141–4149, July 2020 ([Link](#))
- [J9] **Daewon Seo**, Ravi Kiran Raman, Joong Bum Rhim, Vivek K Goyal, Lav R. Varshney “Beliefs in Decision-Making Cascades,” IEEE Transactions on Signal Processing, vol. 67, no. 19, pp. 5103–5117, October 2019 ([Link](#))
- [J10] **Daewon Seo**, Lav R. Varshney “Information and Energy Transmission with Experimentally-Sampled Harvesting Functions,” IEEE Transactions on Communications, vol. 67, no. 6, pp. 4479–4490, June 2019 ([Link](#))
- [J11] Avhishek Chatterjee, **Daewon Seo**, Lav R. Varshney, “Capacity of Systems with Queue-Length Dependent Service Quality,” IEEE Transactions on Information Theory, vol. 63, no. 6, pp. 3950–3963, June 2017 ([Link](#))

- [J12] **Dae-Won Seo**, Sangwoon Jeon, Sae-Young Chung, Junmo Kim, "Rate Enhancement for the Gaussian Z-interference Channel with Transmitter Cooperation," *IEEE Communications Letters*, vol. 14, no. 9, pp. 821–823, September 2010 ([Link](#))

### *Conference Proceedings*

- [C1] **Daewon Seo**, Sung Hoon Lim, "On the Fundamental Tradeoff of Joint Communication and Quick-est Change Detection," in *Proceedings of the 2024 IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 7 July - 12 July 2024, pp. 2796–2801
- [C2] Tuan Dinh, **Daewon Seo**, Zhixu Du, Liang Shang, Kangwook Lee, "Improved Input Reprogramming for GAN Conditioning," *Workshop on Updatable Machine Learning at International Conference on Machine Learning (wICML)*, 23 July 2022 ([Link](#))
- [C3] **Daewon Seo**, Yongjune Kim, "Information and Energy Transmission with Wavelet-Reconstructed Harvesting Functions," in *Proceedings of the 2022 IEEE International Symposium on Information Theory (ISIT)*, Espoo, Finland, 26 June–1 July 2022, pp. 694–699
- [C4] **Daewon Seo**, Hongyi Wang, Dimitris Papailiopoulos, Kangwook Lee, "Empirical Study on the Effective VC Dimension of Low-rank Neural Networks," *Workshop on Overparameterization: Pitfalls & Opportunities, International Conference on Machine Learning (ICML)* 24 July 2021
- [C5] Sourya Basu, **Daewon Seo**, Lav R. Varshney, "Hypergraph-based Coding Schemes for Two Source Coding Problems under Maximal Distortion," in *Proceedings of the 2020 IEEE International Symposium on Information Theory (ISIT)*, Los Angeles, California, 21–26 June 2020, pp. 2426–2431 ([Link](#))
- [C6] **Daewon Seo**, Ravi Kiran Raman, Lav R. Varshney, "Social Learning with Beliefs in a Parallel Network," in *Proceedings of the 2020 IEEE International Symposium on Information Theory (ISIT)*, Los Angeles, California, 21–26 June 2020, pp. 1265–1270 ([Link](#))
- [C7] Mustafa Gursoy, **Daewon Seo**, Urbashi Mitra, "Concentration and Position-Based Hybrid Modulation Scheme for Molecular Communications," in *Proceedings of the IEEE International Conference on Communications (ICC)*, Dublin, Ireland, 7–11 June 2020 ([Link](#))
- [C8] Sourya Basu, **Daewon Seo**, Lav R. Varshney, "Functional Epsilon Entropy," in *Proceedings of the IEEE Data Compression Conference (DCC)*, Snowbird, Utah, 24–27 March 2020, pp. 332–341 ([Link](#))
- [C9] **Daewon Seo**, Lav R. Varshney, "The CEO problem with  $r$ th Power of Difference Distortion," in *Proceedings of the 2019 IEEE International Symposium on Information Theory (ISIT)*, Paris, France, 7–12 July 2019 pp. 2034–2038 ([Link](#))
- [C10] **Daewon Seo**, Lav R. Varshney "Information and Energy Transmission with Experimentally-Sampled Harvesting Functions," in *Proceedings of the 2019 IEEE International Symposium on Information Theory (ISIT)*, Paris, France, 7–12 July 2019, pp. 126–130 ([Link](#))
- [C11] **Daewon Seo**, Avhishek Chatterjee, Lav R. Varshney, "On Multiuser Systems with Queue-Length Dependent Service Quality," in *Proceedings of the 2018 IEEE International Symposium on Information Theory (ISIT)*, Vail, Colorado, 17–22 June 2018, pp. 341–345 ([Link](#))
- [C12] **Daewon Seo**, Ravi Kiran Raman, Lav R. Varshney, "Probability Reweighting in Social Learning: Optimality and Suboptimality," in *Proceedings of the 2018 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Calgary, Canada, 15–20 April 2018, pp. 6966–6970 ([Link](#))
- [C13] **Daewon Seo**, Lav R. Varshney, "Information-Theoretic Limits of Algorithmic Noise Tolerance," in *Proceedings of the 2016 IEEE International Conference on Rebooting Computing (ICRC)*, San Diego, California, 17–19 October 2016 ([Link](#))

[C14] Avhishek Chatterjee, **Daewon Seo**, Lav R. Varshney, “Capacity of Systems with Queue-Length Dependent Service Quality,” in the Proceedings of the International Symposium on Information Theory and Its Applications (ISITA), Monterey, California, 30 October–2 November 2016, pp.552–556 ([Link](#))

[C15] Sang-Woon Jeon, Sung Hoon Lim, Bangchul Jung, **Dae-Won Seo**, “Opportunistic Noisy Network Coding for Fading Parallel Relay Networks,” in the Proceedings of the IEEE Global Communications Conference (GLOBECOM), Houston, Texas, 5–9 December 2011 ([Link](#))

## References

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- Lav R. Varshney (varshney@illinois.edu), University of Illinois at Urbana-Champaign, Associate Professor, +1-217-244-8042, Ph.D. advisor
- Kangwook Lee (kangwook.lee@wisc.edu), University of Wisconsin-Madison, Assistant Professor, +1-608-265-4841, Postdoc host
- Avhishek Chatterjee (avhishek@ee.iitm.ac.in), Indian Institute of Technology Madras, Assistant Professor, +91-44-2257-4452, Co-author of two papers