Curriculum Vitae

O. Ozan Koyluoglu

Contact Information

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Education

University of California, Berkeley, Berkeley, CA
Masters in Business Administration (MBA) **May 2020**

The Ohio State University, Columbus, OH
Ph.D. in Electrical and Computer Engineering **Dec. 2010**
(GPA: 3.98/4.00, GPA in major: 4.00/4.00)

M.S. in Electrical and Computer Engineering **Jun. 2007**
(GPA: 3.96/4.00, GPA in major: 4.00/4.00)

Bilkent University, Ankara, Turkey
B.S. in Electrical and Electronics Engineering **May 2005**
(GPA: 3.89/4.00, GPA in major: 4.00/4.00)

Professional Experience

Pinterest, San Francisco, CA
Engineering Manager **Oct. 2020 – present**
Personalization Team.

Manager of a team of machine learning scientists and engineers.

University of California, Berkeley, Berkeley, CA
Principal Investigator and Research Engineer **Aug. 2017 – Nov. 2020**
Visiting Scholar **Jan. 2017 – Aug. 2017**
Department of Electrical Engineering and Computer Science.

Research on information theory, machine learning, distributed storage and computing.

Glassdoor, San Francisco, CA
Senior Manager **May 2020 – Oct. 2020**
Head of Search & Personalization Machine Learning **Dec. 2018 – Oct. 2020**
Lead Data Scientist and Manager **Oct. 2017 – May 2020**
Member of the Machine Learning Team.

Worked as tech lead and manager of a team of data scientists and machine learning engineers focusing on search ranking, recommendations, personalization, and engagement areas.

- Developed new features and models, run A/B tests, and adopted improvements. Examples: 1) Modernized the job search ranking algorithm. 2) Built a new occupation classification model, which improved the coverage-precision tradeoff. 3) Developed user interest inference and recommendation algorithms. 4) Developed and put into production an engagement platform, optimizing email/push notifications and campaigns, effectively trading off business metrics. 5) Engineered new features for search and recommendations using transformations, embeddings, and association scores.
- Improved conversion and increased revenue (double digit percentages) of the job search ranking product over desktop surface. Other search ranking and recommendation products, e.g., email engagement and mobile job search, had similar improvements in performance.
- Worked on strategy, communications with cross-departmental stakeholders, and hiring.

Huawei, Santa Clara, CA
Staff Researcher **Jan. 2017 – Oct. 2017**
Member of Future Networks Group.

Worked with distinguished engineers in a team reporting to the CTO office. Led the research, innovation and promotion for future technologies in the area of artificial intelligence and machine learning systems for next generation networks. Investigated and developed algorithms for traffic (time series) prediction, network flow classification, and reinforcement learning for network control.

The University of Arizona, Tucson, AZ
Assistant Research Professor **Jan. 2017 – Dec. 2017**
Department of Electrical and Computer Engineering.

Assistant Professor **Dec. 2014 – Jan. 2017**
Graduate lnterdisciplinary Program in Applied Mathematics.

Assistant Professor **Aug. 2013 – Jan. 2017**
Department of Electrical and Computer Engineering.

Research in information theory, computational neuroscience, machine learning, statistics, data storage, cloud computing, wireless communications, and cybersecurity.

- Managed research projects, supervised 8 graduate and 4 undergraduate students with a budget of $1.2M.
- Published 35 papers and prepared 27 grant proposals. Main research activities focus on reliability and security in distributed storage systems, subspace learning and error correcting neural networks, and spiking neural networks.
- Principal investigator on 3 National Science Foundation (NSF) grants in Information & Intelligent Systems (IIS), Computing and Communications Foundations (CCF), and Computer and Network Systems (CNS) divisions.

Teaching

- Courses taught include information theory, detection and estimation, coding theory, communications, and computational neuroscience.

Service

- Served as a member for departmental committees, international conference organizing

and technical committees, editor/reviewer for journals/conferences, and panelist for NSF.

The University of Texas at Austin, Austin, TX
Postdoctoral Fellow **Jan. 2011 – Aug. 2013**
Member of Wireless Networking and Communications Group.

Research in the areas of information theory, coding theory, security, and neuroscience; focusing on codes for wireless networks, information theoretic security, coding for distributed storage systems, and neural coding for memory and spatial navigation (4 journal papers, 13 conference papers). Worked with 8 graduate associates. Conducted joint projects with Samsung Korea (on novel codes for wireless channels) and Huawei Dallas R&D (on codes for memory systems). Guest lecturer in information theory class. Active role in grant applications. (Advisor: Prof. Sriram Vishwanath (ECE). Co-advisor: Prof. Ila Fiete (Neuroscience).)

Alcatel-Lucent Bell Labs, Holmdel, NJ
Research Engineer Intern **Oct. 2010 – Jan. 2011**
Member of Wireless Communication Theory Research Group.

Joint project with Nile University on relaying technologies in wireless mobile networks (published technical reports and 1 conference paper). Collaborated with 2 graduate associates at Nile University. (Advisor: Dr. Antonia Tulino.)

The Ohio State University, Columbus, OH
Presidential Fellow **Jan. 2010 – Dec. 2010**
Research and Teaching Associate **Sep. 2006 – Dec. 2009**
University Fellow **Sep. 2005 – Aug. 2006**
Member of Information Processing Systems Lab.

Research in the areas of information theory and wireless communications, focusing on cognitive radios, information theoretic security, and wireless networks (7 journal papers and 13 conference papers). Collaborated with 3 junior graduate associates during final year. Taught communications (instructor for 2 semesters with full responsibility) and digital signal processing (TA for 1 semester) courses. Thesis: "Wireless physical layer security: An information theoretic approach". (Advisor: Prof. Hesham El Gamal.)

Bilkent University, Ankara, Turkey
Undergraduate Student **Sep. 2001 – May 2005**
High Honor Student with Full Scholarship.

Senior project on "Implementation of Turbo codes": Developed a simulator program in MATLAB, designed various types of interleavers using Verilog and investigated their performances. Taught programming language course (TA for 1 semester) for incoming freshmen. 13 course projects (6 of them are group projects). (Advisor: Prof. Erdal Arikan.)

AYESAS, Ankara, Turkey
Intern Engineer **Jun. 2004 – Aug. 2004**
Member of Software Engineering Group.

Worked as a member of the team for SmartDeck IV&V project of L-3 Avionics Systems. Investigated IEEE 1394 standard, GPS theory, safety critical systems. Developed GPS test tool in MATLAB for verification and test case generation. (AYESAS operates in Aerospace, Defense and Security businesses [ayesas.com].)

ASELSAN, Ankara, Turkey
Intern Engineer **Jul. 2003 – Aug. 2003**
Member of Micro-Electronics, Guidance, and Electro-Optics Group.

Worked in navigation systems team. Proposed analysis with C programming language. Interfaced GPS receiver and LCD using C. Analyzed the GPS system. ("ASELSAN is one of the top 100 defense companies in the world" [aselsan.com].)

Publications

Journal Papers

[J-27] S. Kadhe, A. Heidarzadeh, A. Sprintson, O. O. Koyluoglu, "Single-server private information retrieval schemes are equivalent to locally recoverable coding schemes," *IEEE Journal on Selected Areas in Information Theory*, vol.2, no.1, pp.391-402, Mar. 2021.

[J-26] D. Schwartz and O. O. Koyluoglu, "On the organization of grid and place cells: Neural denoising via subspace learning," *Neural Computation*, vol.31, no.8, pp.1519-1550, Aug. 2019.

[J-25] Y. Chen, O. O. Koyluoglu, and A. J. Han Vinck, "Secrecy over multiple-access channel: A game of competition and cooperation," *Journal of Universal Computer Science*, vol.25, no.8, Aug. 2019.

[J-24] B. Akgun, M. Krunz, and O. O. Koyluoglu, "Vulnerabilities of massive MIMO systems to pilot contamination attacks," *IEEE Transactions on Information Forensics and Security*, vol.14, no.5, pp.1251-1263, May 2019.

[J-23] G. Calis, S. Shivaramaiah, O. O. Koyluoglu, L. Lazos, "Repair strategies for mobile storage systems," *IEEE Transactions on Cloud Computing*, May 2019.

[J-22] Z. Liang, D. Schwartz, G. Ditzler, and O. O. Koyluoglu, "The impact of encoding-decoding schemes and weight normalization in spiking neural networks," *Neural Networks*, vol. 108, pp. 365-378, Dec. 2018.

[J-21] A. S. Rawat, O. O. Koyluoglu, and S. Vishwanath, "Centralized repair of multiple node failures with applications to communication efficient secret sharing," *IEEE Transactions on Information Theory*, vol. 64, no. 12, pp. 7529-7550, Dec. 2018.

[J-20] Y. Chen, O. O. Koyluoglu, and A. J. Han Vinck, "Collective secrecy over the K-transmitter multiple access channel," *IEEE Transactions on Information Forensics and Security*, vol. 13, no. 9, pp. 2279-2293, Sep. 2018.

[J-19] G. Calis and O. O. Koyluoglu, "Architecture-aware coding for distributed storage: Repairable block failure resilient codes," *Advances in Mathematics of Communications*, vol. 12, no. 3, pp. 465-503, Aug. 2018.

[J-18] O. O. Koyluoglu, Y. Pertzov, S. Manohar, M. Husain, and I. R. Fiete, "Fundamental bound on the persistence and capacity of short-term memory stored as graded persistent activity," eLife, vol. 6, no. e22225, Sep. 2017.

[J-17] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "Individual secrecy for the broadcast channel," *IEEE Transactions on Information Theory*, vol. 63, no. 9, pp. 5981-5999, Sep. 2017.

[J-16] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "Individual secrecy for broadcast channels with receiver side information," *IEEE Transactions on Information Theory*, vol. 63, no. 7, pp.

4687-4708, Jul. 2017.

[J-15] G. Calis and O. O. Koyluoglu, "A general construction for PMDS codes," *IEEE Communications Letters*, vol. 21, no. 3, pp. 452-455, Mar. 2017.

[J-14] B. Akgun, O. O. Koyluoglu, and M. Krunz, "Exploiting full-duplex receivers for achieving secret communications in multiuser MISO networks," *IEEE Transactions on Communications*, vol. 65, no. 2, pp. 956-968, Feb. 2017.

[J-13] O. O. Koyluoglu, R. Soundararajan, and S. Vishwanath, "State amplification subject to masking constraints," *IEEE Transactions on Information Theory*, vol. 62, no. 11, pp. 6233-6250, Nov. 2016.

[J-12] H. Si, O. O. Koyluoglu, and S. Vishwanath, "Hierarchical polar coding for achieving secrecy over state-dependent wiretap channels without any instantaneous CSI," *IEEE Transactions on Communications*, vol. 65, no. 9, pp. 3609-3623, Sep. 2016.

[J-11] Y. Yoo, O. O. Koyluoglu, S. Vishwanath, and I. R. Fiete, "Multi-periodic neural coding for adaptive information transfer," *Theoretical Computer Science*, vol. 633, pp. 37-53, Jun. 2016.

[J-10] O. O. Koyluoglu, A. S. Rawat, and S. Vishwanath, "Secure cooperative regenerating codes for distributed storage systems," *IEEE Transactions on Information Theory*, vol. 60, no. 9, pp. 5228-5244, Sep. 2014.

[J-9] H. Si, O. O. Koyluoglu, and S. Vishwanath, "Polar Coding for Fading Channels: Binary and Exponential Channel Cases," *IEEE Transactions on Communications*, vol. 62, no. 8, pp. 2638-2650, Aug. 2014.

[J-8] A. S. Rawat, O. O. Koyluoglu, N. Silberstein, and S. Vishwanath, "Optimal locally repairable and secure codes for distributed storage systems," *IEEE Transactions on Information Theory*, vol. 60, no. 1, pp. 212-236, Jan. 2014.

[J-7] A. El Gamal, O. O. Koyluoglu, M. Youssef, and H. El Gamal, "Achievable secrecy rate regions for the two-way wiretap channel," *IEEE Transactions on Information Theory*, vol. 59, no. 12, pp. 8099-8114, Dec. 2013.

[J-6] K. Khalil, O. O. Koyluoglu, H. El Gamal, and M. Youssef, "Opportunistic secrecy with a strict delay constraint," *IEEE Transactions on Communications*, vol. 61, no. 11, pp. 4700-4709, Nov. 2013.

[J-5] O. O. Koyluoglu and H. El Gamal, "Polar coding for secure transmission and key agreement," *IEEE Transactions on Information Forensics and Security*, vol. 7, no. 5, pp. 1472-1483, Oct. 2012.

[J-4] O. O. Koyluoglu, C. E. Koksal, and H. El Gamal, "On the secrecy capacity scaling in wireless networks," *IEEE Transactions on Information Theory*, vol. 58, no. 5, pp. 3000-3015, May 2012.

[J-3] O. O. Koyluoglu and H. El Gamal, "Cooperative encoding for secrecy in interference channels," *IEEE Transactions on Information Theory*, vol. 57, no. 9, pp. 5682-5694, Sep. 2011.

[J-2] O. O. Koyluoglu, H. El Gamal, L. Lai, and H. V. Poor, "Interference alignment for secrecy," *IEEE Transactions on Information Theory*, vol. 57, no. 6, pp. 3323-3332, Jun. 2011.

[J-1] O. O. Koyluoglu and H. El Gamal, "On power control and frequency reuse in the two user cognitive channel," *IEEE Transactions on Wireless Communications*, vol. 8, no. 7, pp. 3546-3553, Jul. 2009.

Conference Papers

[C-57] S. Kadhe, N. Rajaraman, O. O. Koyluoglu, and K. Ramchandran, "FastSecAgg: Scalable secure aggregation for privacy-preserving federated learning," in Proc. *2020 CCS Workshop on Privacy-Preserving Machine Learning in Practice*, Orlando, FL, Nov. 2020. (Appeared in ICML 2020 as well.)

[C-56] S. Kadhe, N. Rajaraman, O. O. Koyluoglu, and K. Ramchandran, "FastSecAgg: Scalable secure aggregation for privacy-preserving federated learning," in Proc. *2020 ICML International Workshop on Federated Learning for User Privacy and Data Confidentiality*, Vienna, Austria, Jul. 2020.

[C-55] S. Kadhe, O. O. Koyluoglu, and K. Ramchandran, "Communication-efficient gradient coding for straggler mitigation in distributed learning," in Proc. *2020 IEEE International Symposium on Information Theory (ISIT 2020)*, Los Angeles, CA, Jun. 2020.

[C-54] S. Kadhe, A. Heidarzadeh, A. Sprintson, and O. O. Koyluoglu, "On an equivalence between single-server PIR with side information and locally recoverable codes," in Proc. 2019 *IEEE Information Theory Workshop (ITW 2019)*, Visby, Sweden, Aug. 2019. (Appeared in ITA 2019 as well.)

[C-53] S. Kadhe, O. O. Koyluoglu, and K. Ramchandran, "Gradient coding based on block designs for mitigating adversarial stragglers," in Proc. *2019 IEEE International Symposium on Information Theory (ISIT 2019)*, Paris, France, Jul. 2019.

[C-52] S. Kadhe, A. Heidarzadeh, A. Sprintson, and O. O. Koyluoglu, "On an equivalence between single-server PIR with side information and locally recoverable codes," in Proc. *2019 Information Theory and Applications Workshop (ITA 2019)*, San Diego, CA, Feb. 2019.

[C-51] Y. Chen, O. O. Koyluoglu, and A. J. Han Vinck, "Secrecy in communication networks: Being cooperative or competitive?," in Proc. *Codassca Workshop: Collaborative Technologies and Data Science in Smart City Applications*, Yerevan, Armenia, Sep. 2018.

[C-50] Y. Chen, O. O. Koyluoglu, and A. J. Han Vinck, "Joint secrecy over the K-transmitter multiple access channel," in Proc. *2017 IEEE Information Theory Workshop (ITW 2017)*, Kaohsiung, Taiwan, Nov. 2017.

[C-49] B. Akgun, O. O. Koyluoglu, and M. Krunz, "Pilot contamination attacks in massive MIMO systems," in Proc. *2017 IEEE Conference on Communications and Network Security (CNS 2017)*, Las Vegas, NV, Oct. 2017.

[C-48] I. Samy, O. O. Koyluoglu, and A. S. Rawat, "Efficient data access in hybrid cloud storage," in Proc. *2017 55th Annual Allerton Conference on Communication, Control, and Computing (Allerton 2017)*, Monticello, IL, Oct. 2017.

[C-47] I. Samy, G. Calis, and O. O. Koyluoglu, "Secure regenerating codes for hybrid cloud storage systems," in Proc. *2017 IEEE International Symposium on Information Theory (ISIT 2017)*, Aachen, Germany, Jun. 2017.

[C-46] D. Schwartz and O. O. Koyluoglu, "Neural noise improves path representation in a simulated network of grid, place, and time cells," in Proc. *2017 Computational and Systems Neuroscience (Cosyne 2017)*, Salt Lake City, UT, Feb. 2017.

[C-45] S. Shivaramaiah, G. Calis, O. O. Koyluoglu, and L. Lazos, "Threshold-based file maintenance strategies for mobile cloud storage systems," in Proc. *IEEE 2016 Global Communications Conference (Globecom 2016)*, Washington, DC, Dec. 2016.

[C-44] M. Ragone, S. Gianelli, D. Schwartz, L. Su, O. O.Koyluoglu, J. M. Fellous, "The role of hippocampal replay in a computational model of path learning," in Proc. *Neuroscience 2016*, San Diego, CA, Nov. 2016.

[C-43] D. Schwartz and O. O. Koyluoglu, "A hybrid code from grid and place cells," in Proc. *Neuroscience 2016*, San Diego, CA, Nov. 2016.

[C-42] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "Individual secrecy for the broadcast channel," in Proc. *2016 International Symposium on Information Theory and Its Applications (ISITA 2016)*, Monterey, CA, Oct. 2016.

[C-41] Y. Chen, O. O. Koyluoglu, and A. J. Han Vinck, "On secure communication over the multiple

access channel," in Proc. *2016 International Symposium on Information Theory and Its Applications (ISITA 2016)*, Monterey, CA, Oct. 2016.

[C-40] G. Calis and O. O. Koyluoglu, "On the maintenance of distributed storage systems with backup node for repair," in Proc. *2016 International Symposium on Information Theory and Its Applications (ISITA 2016)*, Monterey, CA, Oct. 2016.

[C-39] A. S. Rawat, O. O. Koyluoglu, and S. Vishwanath, "Centralized repair of multiple node failures," in Proc. *2016 IEEE International Symposium on Information Theory (ISIT 2016)*, Barcelona, Spain, Jul. 2016.

[C-38] A. S. Rawat, O. O. Koyluoglu, and S. Vishwanath, "Progress on high-rate MSR codes: Enabling arbitrary number of helper nodes," in Proc. *2016 Information Theory and Applications Workshop (ITA 2016)*, La Jolla, CA, Feb. 2016. (Invited.)

[C-37] B. Akgun, O. O. Koyluoglu, and M. Krunz, "Receiver-based friendly jamming with single-antenna full-duplex receivers in a multiuser broadcast channel," in Proc. *2015 IEEE Global Communications Conference (Globecom 2015)*, San Diego, CA, Dec. 2015.

[C-36] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "On the individual secrecy rate region for the broadcast channel with an external eavesdropper," in Proc. *2015 IEEE International Symposium on Information Theory (ISIT 2015)*, Hong Kong, China, Jun. 2015.

[C-35] H. Si, O. O. Koyluoglu, and S. Vishwanath, "Achieving secrecy without any instantaneous CSI: Polar coding for fading wiretap channels," in Proc. *2015 IEEE International Symposium on Information Theory (ISIT 2015)*, Hong Kong, China, Jun. 2015.

[C-34] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "On the individual secrecy for Gaussian broadcast channels with receiver side information," Proc. *2015 IEEE International Conference on Communications (ICC 2015)*, London, UK, Jun. 2015.

[C-33] I. Aykin, O. O. Koyluoglu, and J.-M. Fellous, "Formation of dorso-ventral grid cell modules: The role of learning," *2015 Computational and Systems Neuroscience (Cosyne 2015)*, Salt Lake City, UT, Mar. 2015.

[C-32] G. Calis and O. O. Koyluoglu, "Repairable block failure resilient codes," in Proc. *2014 IEEE International Symposium on Information Theory (ISIT 2014)*, Honolulu, HI, Jun. 2014.

[C-31] Y. Chen, O. O. Koyluoglu, and A. Sezgin, "On achievable individual-secrecy rate region for broadcast channels with receiver side information," in Proc. *2014 IEEE International Symposium on Information Theory (ISIT 2014)*, Honolulu, HI, Jun. 2014.

[C-30] H. Si, O. O. Koyluoglu, and S. Vishwanath, "Lossy compression of exponential and laplacian sources using expansion coding," in Proc. *2014 IEEE International Symposium on Information Theory (ISIT 2014)*, Honolulu, HI, Jun. 2014.

[C-29] A. S. Rawat, N. Silberstein, O. O. Koyluoglu, and S. Vishwanath, "Secure distributed storage systems: Local repair with minimum bandwidth regeneration," in Proc. *International Symposium on Communications, Control, and Signal Processing: Special Session on Security in Distributed and Cloud Storage Systems (ISCCSP'14 - SS1)*, Athens, Greece, Apr. 2014.

[C-28] O. O. Koyluoglu, Y. Chen, and A. Sezgin, "Broadcast channel with receiver side information: Achieving individual secrecy," in Proc. *2014 International Zurich Seminar on Communications (IZS 2014)* , Zurich, Switzerland, Feb. 2014.

[C-27] H. Si, O. O. Koyluoglu, and S. Vishwanath, "Polar coding for fading channels," in Proc. *2013 IEEE Information Theory Workshop (ITW 2013)*, Seville, Spain, Sep. 2013.

[C-26] G. Kamath, N. Silberstein, N. Prakash, A. S. Rawat, V. Lalitha, O. O. Koyluoglu, P. V. Kumar, and S. Vishwanath, "Explicit MBR all-symbol locality codes," in Proc. *2013 IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey, Jul. 2013.

[C-25] A. S. Rawat, O. O. Koyluoglu, N. Silberstein, and S. Vishwanath, "Secure locally repairable

codes for distributed storage systems," in Proc. *2013 IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey, Jul. 2013.

[C-24] O. O. Koyluoglu, A. S. Rawat, and S. Vishwanath, "The secrecy capacity of minimum bandwidth cooperative regenerating codes," in Proc. *2013 IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey, Jul. 2013.

[C-23] N. Silberstein, A. S. Rawat, O. O. Koyluoglu, and S. Vishwanath, "Optimal locally repairable codes via rank-metric codes," in Proc. *2013 IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey, Jul. 2013.

[C-22] O. O. Koyluoglu and I. R. Fiete, "Information-theoretic limits on encoding over diverse populations," *2013 Computational and Systems Neuroscience (Cosyne 2013)*, Salt Lake City, UT, Feb. 2013.

[C-21] A. S. Rawat, N. Silberstein, O. O. Koyluoglu, and S. Vishwanath, "Optimal locally repaiarable codes with local minimum storage regeneration via rank-metric codes," in Proc. *2013 Information Theory and Applications Workshop (ITA 2013)*, San Diego, CA, Feb. 2013. (Invited.)

[C-20] Y. Yoo, O. O. Koyluoglu, S. Vishwanath, and I. Fiete, "Dynamic shift-map coding with side information at the decoder," in Proc. *Fiftieth Annual Allerton Conference on Communication, Control, and Computing (Allerton 2012)*, Monticello, IL, Oct. 2012.

[C-19] O. O. Koyluoglu, K. Appaiah, H. Si, and S. Vishwanath, "Expansion coding: Achieving the capacity of an AEN channel," in Proc. *2012 IEEE International Symposium on Information Theory (ISIT 2012)*, Boston, MA, Jul. 2012.

[C-18] M. Fadel, A. Hindy, A. El-Keyi, M. Nafie, O. O. Koyluoglu, and A. M. Tulino, "Resource allocation for throughput enhancement in cellular shared relay networks," in Proc. *35th IEEE Sarnoff Symposium (Sarnoff 2012)*, Newark, NJ, May 2012.

[C-17] O. O. Koyluoglu and I. R. Fiete, "Information theoretic limits on performance in short-term memory tasks," *2012 Computational and Systems Neuroscience (Cosyne 2012)*, Salt Lake City, UT, Feb. 2012. (travel grant award)

[C-16] S. Vishwanath, O. O. Koyluoglu, H. Si, K. Appaiah, "Coding over binary expansions," in Proc. *2012 Information Theory and Applications Workshop (ITA 2012)*, San Diego, CA, Feb. 2012. (Invited.)

[C-15] O. O. Koyluoglu, R. Soundararajan, and S. Vishwanath, "State amplification under masking constraints," in Proc. *Forty-Ninth Annual Allerton Conference on Communication, Control, and Computing (Allerton 2011)*, Monticello, IL, Sep. 2011.

[C-14] K. Appaiah, O. O. Koyluoglu, and S. Vishwanath, "Polar alignment for interference networks," in Proc. *Forty-Ninth Annual Allerton Conference on Communication, Control, and Computing (Allerton 2011)*, Monticello, IL, Sep. 2011. (Invited.)

[C-13] M. Shahmohammadi, O. O. Koyluoglu, T. Khattab, and H. El Gamal, "On the degrees of freedom of the cognitive broadcast channel," in Proc. *2011 IEEE International Symposium on Information Theory (ISIT 2011)*, Saint Petersburg, Russia, Jul. 2011.

[C-12] O. Gungor, O. O. Koyluoglu, H. El Gamal, and C. Emre Koksal, "Proactive source coding," in Proc. 2011 *IEEE International Symposium on Information Theory (ISIT 2011)*, Saint Petersburg, Russia, Jul. 2011.

[C-11] M. Shahmohammadi, O. O. Koyluoglu, T. Khattab, and H. El Gamal, "Joint interference cancellation and dirty paper coding for cognitive cellular networks," in Proc. *2011 IEEE Wireless Communications and Networking Conference (WCNC 2011)*, Cancun, Mexico, Mar. 2011.

[C-10] O. O. Koyluoglu and H. El Gamal, "Polar coding for secure transmission and key agreement,"

in Proc. *2010 IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2010), Special Session on Physical Layer Security*, Istanbul, Turkey, Sep. 2010. (Invited.)

[C-9] E. Toher, O. O. Koyluoglu, and H. El Gamal, "Secrecy games over the cognitive channel," in Proc. *2010 IEEE International Symposium on Information Theory (ISIT 2010)*, Austin, TX, Jun. 2010.

[C-8] O. O. Koyluoglu, C. E. Koksal, and H. El Gamal, "On the effect of colluding eavesdroppers on secrecy capacity scaling," in Proc. *European Wireless 2010 (EW 2010), Invited Session on Physical Layer Security*, Lucca, Italy, Apr. 2010. (Invited.)

[C-7] O. O. Koyluoglu, C. E. Koksal, and H. El Gamal, "On the secrecy capacity scaling in wireless networks," in Proc. *2010 Information Theory and Applications Workshop (ITA 2010)*, UCSD, La Jolla, CA, Feb. 2010. (Invited.)

[C-6] A. El Gamal, O. O. Koyluoglu, M. Youssef, and H. El Gamal, "New achievable secrecy rate regions for the two way wiretap channel," in Proc. *2010 IEEE Information Theory Workshop (ITW 2010)*, Cairo, Egypt, Jan. 2010.

[C-5] K. Khalil, M. Youssef, O. O. Koyluoglu, and H. El Gamal, "On the delay limited secrecy capacity of fading channels," in Proc. *2009 IEEE International Symposium on Information Theory (ISIT 2009)*, Seoul, Korea, Jun. 2009.

[C-4] O. O. Koyluoglu, M. Shahmohammadi, and H. El Gamal, "A new achievable rate region for the X channel," in Proc. *2009 IEEE International Symposium on Information Theory (ISIT 2009)*, Seoul, Korea, Jun. 2009.

[C-3] O. O. Koyluoglu and H. El Gamal, "On the secrecy rate region for the interference channel," in Proc. *2008 IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2008), Special Session on Physical Layer Security*, Cannes, France, Sep. 2008. (Invited.)

[C-2] O. O. Koyluoglu, H. El Gamal, L. Lai, and H. V. Poor, "On the secure degrees of freedom in the K-user Gaussian interference channel," in Proc. *2008 IEEE International Symposium on Information Theory (ISIT 2008)*, Toronto, ON, Jul. 2008.

[C-1] O. O. Koyluoglu and H. El Gamal, "On the utility of frequency reuse in cognitive radio channels," in Proc. *IEEE International Symposium on Information Theory (ISIT 2007)*, Nice, France, Jun. 2007.

Thesis

[T-1] O. O. Koyluoglu, "Wireless physical layer security: An information theoretic approach," *PhD dissertation*, The Ohio State University, Dec. 2010.

Awarded Grants

- *PI*, NSF TWC: Small: Coding-based Mechanisms for Building Secure Cloud Storage Systems (Grant number: CNS-1617335, Award amount: $360,000, Award period: 08/01/16 - 07/31/19, Percent effort: 100%.)
- *PI*, NSF CIF: Medium: Collaborative Research: Frontiers in coding for cloud storage systems (Grant number: CCF-1563622, Award amount: $400,000, Award period: 03/01/16 - 02/28/19, Percent effort: 100%.) This is a collaborative project with PIs Venkatesan Guruswami (CMU) and Sriram Vishwanath (UT Austin).
- *PI*, NSF CRII: RI: Navigational Circuitry of Brain: Novel Neural Codes with Diversity for Robust and Adaptive Location Processing (Grant number: IIS-1464349, Award amount: $115,247, Award period: 04/2015 - 03/2017, Percent effort: 100%).

Honors and Awards

Cosyne Travel Grant Award by the Cosyne 2012 Grant Committee **2012**

Awarded to "early career scientists with highly scored abstracts" for the work titled "Information theoretic limits on performance in short-term memory tasks". Sponsored by the Gatsby Charitable Foundation.

Presidential Fellowship Award by the Graduate School of The Ohio State University **2010**

Awarded to ∼20 students each semester after a university-wide selection, includes tuition waiver and stipend for a year. "The Presidential Fellowship is the most prestigious award given by the Graduate School."

University Fellowship Award by the Graduate School of The Ohio State University **2005**

Awarded to top incoming students, includes tuition waiver and stipend for a year.

Bilkent University High Honor Student **2001 – 2005**

Awarded to high GPA students, received it for all semesters.

Full Undergraduate Scholarship by Bilkent University **2001**

Awarded to top incoming students, includes tuition waiver, stipend, and housing for four years.

Study Abroad Scholarship by the Turkish Governmental Education Office **2001**

Awarded to top 200 students in the national university entrance exam of Turkey, includes undergraduate education coverage in overseas.

Ranked 179th in the National University Entrance Exam of Turkey **2001**

National university entrance exam is taken by ∼1.5 million students.

Teaching Experience and Coursework

The University of Arizona, Tucson, AZ

Teaching

- ECE 639 Detection and Estimation (Spring 2014, Spring 2016): Lecture slides are prepared and videos are recorded for online offering. (Course offered online during both semesters.)
- APPL 595B Theoretical Neuroscience Journal Club (Spring 2015, Fall 2015, Spring 2016, Fall 2016): Co-offered with J.-M. Fellous (Psychology), K. Lin (Applied Math), C. Zhang (Applied Math). This interdisciplinary course is based on introductory seminars of the instructors followed by discussion of seminal works and recent research papers in the area.
- ECE/MATH 636 Information Theory (Fall 2013, Fall 2015): Lecture notes and course materials are prepared. Slides and videos are prepared for the online offering. (Course offered online during Fall 2015.)

- ECE 340A Introduction to Communications (Spring 2015): Prepared lecture slides and course materials.
- ECE 637 Coding Theory (Fall 2014): Prepared lecture slides and course materials.

The University of Texas at Austin, Austin, TX

Teaching
- EE 381K Information Theory (Spring 2012): Instructed data compression and coding (2 lectures), the channel coding theorem (1 lecture), network information theory (4 lectures)

Coursework (classes attended)
- Statistical Methods in Computational Neuroscience, Principles of Neuroscience I, Advanced Topics in Data Mining

The Ohio State University, Columbus, OH

Teaching
- ECE 702 Digital Communications (Spring 2009): Held problem solving sessions
- ECE 609 DSP Lab (Spring 2007): Instructed lab sessions (involving designs on filter implementations, FFT, and adaptive filtering for system identification and interference cancellation), received travel grant to visit UIUC, redesigned the course with TI-55x boards, prepared new assignments and lab manuals
- ECE 508 Communication Lab (Winter 2007, Winter 2008): Instructed lab sessions with full responsibility, prepared lecture notes, quizzes, exams, and held both theory and lab sessions

Coursework
- Engineering: Linear System Theory, Random Signal Analysis, Random Processes, Signal Detection and Estimation, Communication Networks, Coding Theory, Information Theory, Feedback Control Systems, Optimization Based Network Algorithm Design, Wireless Communications, Optimal Control Theory, Cryptography
- Mathematics and Statistics: Real Analysis, Linear Algebra, Abstract Algebra, Statistical Learning Theory

Course Projects
- "Learning with missing data" with N. Ramakrishnan (Mar. 2009)
- "A fundamental tradeoff in wireless channels: Diversity and multiplexing" with M. Shahmohammadi and O. Gungor (Mar. 2009)
- "Rate control for multicast with network coding: Optimization based methods" (Dec. 2008)
- "Reliable transmission with secrecy: The wiretap channel" (Mar. 2007)

Bilkent University, Ankara, Turkey

Teaching
- CS 101 Algorithms and Programming (Fall 2003): Instructed lab sessions for a group of 30 students

Coursework
- Computer Organization, Programming Languages, Computer Networks, Digital Electronics, Telecommunications, Digital Signal Processing, Int. to CMOS VLSI Design, Wireless Communications, Probability, Neural Networks, Information Theory

Course Projects

- Electrical-to-mechanical-to-electrical energy conversion
- Implementation of digital circuit simulator in JAVA
- TRC 10, implementation of an amplitude modulation superheterodyne transceiver that operates in the 10-meter amateur band on hardware
- Simulation of a single cycle processor in Verilog
- Design of "OxO Set Programming Language", making its lexical and syntactic analyzers using lex and yacc tools of Unix
- Computer networks projects: Design of multi-threaded web server, mail user agent, simple chat program in JAVA, and implementation of a reliable transport protocol in C
- Design of CMOS logic circuits using MAGIC and Irsim softwares
- Simulation of cruise control of a toy car in Simulink
- DSP Projects: Estimation of DTMF tones, JPEG algorithm-like data compression, and design of equiripple FIR filters in MATLAB
- Design of a chip in MAGIC that drives MEMS capacitors and communicates with a RAM
- Investigation of quantum information theory
- Neural network projects: Recognition of integers using perceptron training algorithm, and function approximation using back propagation algorithm.
- QoS measurements in GSM networks

Research Supervising and Mentoring

University of California, Berkeley, CA

Postdoctoral Studies co-directed

- Amirali Aghazadeh (Summer 2019 – Fall 2020): Research on machine learning.
- Swanand Kadhe (Spring 2018 – Fall 2020): Research on machine learning, cloud storage, security, information theory.

The University of Arizona, Tucson, AZ

PhD Dissertations directed/co-directed

- Islam Samy (Fall 2016 – Fall 2017): Research on cloud storage security. (PhD student, published 2 conference papers.)
- Berk Akgun (Fall 2014 – Fall 2017): Research on wireless networking and security. Co-advised with Prof. Marwan Krunz. (PhD student, published 1 conference paper, submitted 1 journal and 1 conference papers.)
- Gokhan Calis (Fall 2013 – Summer 2017): Research on coding theory and distributed storage systems. (PhD student graduated with a thesis, published 3 journal papers and 4 conference papers.)

MS Theses directed/co-directed

- Zhengzhong Liang (Fall 2016 – Fall 2017): Research on machine learning and computational neuroscience. (MS student. Published 1 journal paper)
- David Schwarz (Fall 2015 – Spring 2017): Research on computational neuroscience. (MS student graduated with a thesis, published 2 journal papers and 3 conference papers.)

Independent studies, collaborations with undergraduate and graduate students on research projects

- Jiashu Guo (Fall 2016 – Spring 2017): Research on machine learning and computational

neuroscience. (MS student visiting.)
- Michael Ragone (Spring 2016 – Fall 2016): Research on computational neuroscience, hippocampal replay and path learning. (UG student, published 1 conference paper.)
- Sam Jared Gianelli (Spring 2016 – Fall 2016): Research on computational neuroscience, hippocampal replay and path learning. (UG student, published 1 conference paper.)
- Irmak Aykin (Fall 2014 – Summer 2015): Research on computational neuroscience. (PhD student, member of the lab for two semesters, published 1 conference paper.)
- Shuai Yuan (Summer 2014 – Fall 2014): Research on navigational mechanisms of brain. (MS student, summer volunteer and independent study, finished a project with UG students.)
- Atta Kashmiri (Summer 2014): Research on computational neuroscience. (UG student, gained research experience.)
- Nikitha Ramohalli (Summer 2014): Research on computational neuroscience. (UG student, gained research experience, received NASA Fellowship Award in September 2014.)

The University of Texas at Austin, Austin, TX

Collaborations with graduate students on research projects
- Hongbo Si (Spring 2011 – Spring 2015): Research on expansion coding and polar codes. (Published 2 journal papers, and 5 conference papers.)
- Yongseok Yoo (Spring 2012 – Spring 2013): Research on shift-map codes. (Published 1 journal paper and 1 conference paper.)
- Ankit Singh Rawat (Spring 2012 – Spring 2013): Research on coding for distributed storage systems (supervised with Dr. Natalia Silberstein). Worked on the project with Huawei Dallas R&D on coding for memory systems. (Published 2 journal papers, and 6 conference papers.)
- Muryong Kim (Fall 2012): Research on shaping of codes for AWGN channels (LDPC) for the project with Samsung Korea.
- Kumar Appaiah (Summer 2011 – Fall 2011): Research on polar coding for networks and expansion coding. (Published 3 conference papers.)
- Rajiv Soundararajan (Summer 2011 – Fall 2011): Research on information theoretic security. (Published 1 journal paper, and published 1 conference paper.)
- Fabio Fernandez (Spring 2011): Research on polar coding for networks.
- Cong Li (Spring 2011-Summer 2011): Research on private queuing mechanisms and smart grid privacy.

Alcatel-Lucent Bell Labs, Holmdel, NJ

Collaborations on research projects
- Mohamed Fadel (Fall 2010 – Spring 2011): Research on cellular shared relay networks. Mr. Fadel was with Nile University, Egypt. (Publised 1 conference paper.)
- Ahmed Hindy (Fall 2010 – Spring 2011): Research on cellular shared relay networks. Mr. Hindy was with Nile University, Egypt. (Publised 1 conference paper.)

The Ohio State University, Columbus, OH

Collaborations with graduate students on research projects
- Onur Gungor (Spring 2010 – Fall 2010): Research on proactive source coding. Mr. Gungor was a PhD student at Ohio State. (Publised 1 conference paper.)
- Elizabeth Toher (Fall 2009): Research on cognitive network security. Mrs. Toher was a M.Sc. student at Ohio State. (Publised 1 conference paper.)
- Karim Khalil (Fall 2008 – Spring 2009): Research on secure networks with delay constraints.

Mr. Khalil was with Nile University, Egypt. (Published 1 journal paper, and 1 conference paper.)

Professional Service and Memberships

Departmental Committees

Computing Policy Committee Member, Department of Electrical and Computer Engineering, University of Arizona. **2013 – 2015, 2016 – 2017**

Executive Committee Member, Department of Electrical and Computer Engineering, University of Arizona. **2014 – 2016**

Committee on Committees Member, Department of Electrical and Computer Engineering, University of Arizona. **2014 – 2016**

Graduate Recruiting and Awards Committee Member, Department of Electrical and Computer Engineering, University of Arizona. **2014 – 2015**

Dissertation and Graduate Exam Committee Memberships, Department of Electrical and Computer Engineering, University of Arizona. **2014 – 2017**

6 PhD Defenses, 2 MS Defenses, 10 PhD Written Comprehensive Exams, 5 PhD Oral Comprehensive Exams. (These are non-advisor activities.)

Local/State Outreach

SARSEF grant judge for Middle School projects **Spring 2014, 2015, 2016**

Around 75,000 students participate to the fair each year. Winners get awards at the end of the fair and advance to the higher level competitions, including the International Science and Engineering Fair (ISEF). Participated with my graduate associates.

Service for Professional Organizations

Editor for

- IEEE Transactions on Wireless Communications (2015-2018)

Co-Chair for

- 2017 IEEE International Conference on Communications, Selected Areas in Communications Symposium (Data Storage Track)

Organizing Committee Member for

- 2010 IEEE Information Theory Workshop (Publicity Committee)

Technical Program Committee Member for

- 2018 IEEE International Conference on Computer Communications (INFOCOM)
- 2017 IEEE International Conference Communications, Communication and Information Systems Security Symposium (ICC'17 CISS)
- 2017 IEEE International Conference on Computer Communications (INFOCOM)
- 2016 ICC Workshop on Wireless Physical Layer Security
- 2015 CNS Workshop on Physical-layer Methods for Wireless Security
- 2015 IEEE International Symposium on Information Theory (ISIT)

Reviewer for IEEE Transactions on Information Theory, IEEE Transactions on Wireless Communications, IEEE Transactions on Information Forensics and Security, IEEE/ACM Transactions on Networking, IEEE Transactions on Vehicular Technology, IEEE Transactions on Communications, IEEE Journal on Selected Areas in Communications, EURASIP Journal on Wireless Communications and Networking, IEEE Communications Letters, IEEE Signal Processing Letters, Ad Hoc Networks, PLOS Computational Biology, Journal of Computer Security, Army Research Office, Israel Science Foundation, and several conferences including IEEE ISIT, IEEE Globecom, IEEE ICC, IEEE VTC, IEEE PIMRC, MILCOM, IEEE INFOCOM, European Wireless, IEEE ITW, IEEE Dyspan, ISITA, IWCIT, ISTC.

Panelist at NSF (2015, 2016, 2017) for CCF, CNS, and IIS programs.

Senior Member of IEEE (Student Member 2002-2010, Member 2011-2017).

Member of IEEE Information Theory Society, IEEE Communications Society, Society for Neuroscience.