

Emrah Akyol

CONTACT INFORMATION

Electrical & Computer Engineering
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EDUCATION

University of California, Santa Barbara, ECE, Ph.D. **2011**

- Thesis: Complexity and Delay Constrained Compression and Transmission of Information
- Advisor: Prof. Kenneth Rose

Koc University, ECE, MS **2005**

- MS thesis: Adaptive Scalable Video Coding
- Advisors: Prof. Murat Tekalp and Prof. Reha Civanlar

Bilkent University, EE, BS **2003**

PROFESSIONAL EXPERIENCE

UCSB, Postdoctoral Research Associate **2011 – Present**
Host: Prof. Kenneth Rose

UCSB, Teaching Assistant/ Research Assistant **2007 – 2011**
Teaching assistant for Information Theory, Signal Compression, Error Correcting Codes, Pattern Recognition, Probability, Digital Signal Processing, and Signal Analysis.

NTT DoCoMo Research Labs, Palo Alto, CA **2006 – 2007**
Research on directional transforms for image coding with Prof. Reha Civanlar and Dr. Onur Guleryuz.

Hewlett Packard Research Labs, Palo Alto, CA **2006**
Developed a complexity scalable video codec, based on H.264 standard, and filed a patent with Dr. Debargha Mukherjee.

Koc University **2003 – 2005**
Teaching assistant for Digital Image-Video Processing, Digital Signal Processing, and Signal Analysis.

PATENT

1. **E. Akyol** and D. Mukherjee, “Scaling the Complexity of Video Encoding”, U.S. Patent, WO 2008/079353, 2008

JOURNAL PAPERS

1. K. Viswanatha, **E. Akyol** and K. Rose, “An Achievable Rate Region for Distributed Source Coding with Dispersive Information Routing”, *IEEE Trans. on Information Theory*, in review.
2. **E. Akyol** and K. Rose, “Towards Optimality in Transform Coding”, *IEEE Trans. on Information Theory*, in review.
3. **E. Akyol**, K. Viswanatha, K. Rose, and T. Ramstad, “On Zero Delay Source Channel Coding”, *IEEE Trans. on Information Theory*, in review.
4. **E. Akyol** and K. Rose, “On Optimal Randomized Quantization”, *IEEE Trans. on Signal Processing*, in review.
5. **E. Akyol**, K. Viswanatha, and K. Rose, “On Conditions for Linearity of Optimal Estimation”, *IEEE Trans. on Information Theory*, scheduled to appear in June 2012.
6. **E. Akyol** and M. vander Schaar, “Compression-Aware Energy Optimization for Video Decoding Systems with Passive Power”, *IEEE Trans. on Circuits and Systems for Video Tech.*, 18- 9 2008.
7. **E. Akyol** and M. vander Schaar, “Complexity Model Based Proactive Dynamic Voltage Scaling for Video Decoding Systems”, *IEEE Trans. on Multimedia*, 9-(7) 2007.
8. **E. Akyol**, M. Tekalp, and R. Civanlar, “A Flexible Multiple Description Coding Framework for Adaptive Peer-to-peer Video Streaming”, *IEEE Journal on Selected Topics in Signal Processing*, 1(2) 2007.
9. **E. Akyol**, M. Tekalp, and R. Civanlar, “Content-aware Scalability Type Selection for Rate Adaptation of Scalable Video”, *EURASIP Journal on Advances in Signal Processing*, 2007.

1. **E. Akyol**, K. Viswanatha, and K. Rose, "Linearity Conditions for Optimal Estimation From Multiple Noisy Measurements ", *IEEE Statistical Signal Processing Workshop 2012*.
2. **E. Akyol** and K. Rose, "On Linear Transforms in Zero-delay Gaussian Source Channel Coding",*IEEE Int. Symposium on Information Theory 2012*.
3. **E. Akyol**, K. Viswanatha, and K. Rose, "Combinatorial Message Sharing and Random Binning for Multiple Description Coding",*IEEE Int. Symposium on Information Theory 2012*.
4. K. Viswanatha, **E. Akyol**, and K. Rose, "Lossy Common Information of Two Dependent Random Variables", *IEEE Int. Symposium on Information Theory 2012* .
5. **E. Akyol** and K. Rose, "Towards Optimality in Multiterminal Transform Coding", *IEEE Data Compression Conference 2012*.
6. **E. Akyol** and K. Rose, "On Constrained Randomized Quantization", *IEEE Data Compression Conference 2012*.
7. K. Viswanatha, **E. Akyol**, and K. Rose, " A Strictly Improved Achievable Region for Multiple Descriptions Using Combinatorial Message Sharing", *IEEE Information Theory Workshop 2011*.
8. K. Viswanatha, **E. Akyol**, and K. Rose, "An Optimal Transmit-Receive Rate Tradeoff in Gray-Wyner Network and Its Relation to Common Information", *IEEE Information Theory Workshop 2011*.
9. **E. Akyol** and K. Rose, "A Necessary and Sufficient Condition for Transform Optimality in Source Coding", *IEEE Int. Symposium on Information Theory 2011*.
10. K. Viswanatha, **E. Akyol**, and K. Rose, "An Achievable Rate Region for Distributed Source Coding and Dispersive Information Routing", *IEEE Int. Symposium on Information Theory 2011*.
11. K. Viswanatha, **E. Akyol**, and K. Rose, "Combinatorial Message Sharing for a Refined Multiple Descriptions Achievable Region", *IEEE Int. Symposium on Information Theory 2011*.
12. **E. Akyol**, K. Viswanatha, and K. Rose, "On Optimal Multidimensional Estimation: Linearity Conditions ", *IEEE Statistical Signal Processing Workshop 2011*.
13. **E. Akyol**, K. Viswanatha, and K. Rose, "On Conditions for Linearity of Optimal Estimation", *IEEE Information Theory Workshop*, 2010.
14. K. Viswanatha, **E. Akyol**, and K. Rose, "On Optimum Communication Cost for Joint Compression and Dispersive Information Routing", *IEEE Information Theory Workshop*, 2010.
15. K. Viswanatha, **E. Akyol**, and K. Rose, "Distributed source coding and dispersive information routing: An integrated approach with networking and database applications", *European Signal Processing Conference*, 2010.
16. K. Viswanatha, **E. Akyol**, and K. Rose, "Towards Optimum Cost in Multi-hop Networks with Arbitrary Network Demands ", *IEEE Int. Symposium on Information Theory*, 2010.
17. **E. Akyol**, K. Rose, and T. Ramstad, "Optimized Analog Mappings for Distributed Source Channel Coding", *IEEE Data Compression Conference*, 2010.
18. **E. Akyol**, K. Rose, and T. Ramstad "Optimal Mappings for Joint Source Channel Coding", *IEEE Information Theory Workshop*, 2010.
19. **E. Akyol** and K. Rose, "On Transform Coding with Dithered Quantizers", *IEEE Data Compression Conference*, 2009.
20. **E. Akyol** and K. Rose, "Nonuniform Dithered Quantization", *IEEE Data Compression Conference*, 2009.
21. **E. Akyol**, O. Guleryuz , and R. Civanlar, "Royalty Cost Based Optimization for Video Compression", *IEEE International Conference on Image Processing*, 2007.
22. **E. Akyol**, D. Mukherjee, and Y. Liu, "Complexity Control for Real Time Video Coding", *IEEE International Conference on Image Processing*, 2007.
23. **E. Akyol** and M. van der Schaar, "Buffer Constrained Proactive Dynamic Voltage Scaling for Video Decoding Systems", *IEEE International Conference on Image Processing*, 2007.
24. **E. Akyol**, M. Tekalp, and R. Civanlar, "Adaptive Peer to Peer Video Streaming with Flexible Multiple Description Coding", *IEEE International Conference on Image Processing*, 2006.

25. **E. Akyol**, M.Tekalp, and R.Civanlar, "Optimum Bit Allocation in Scalable Multiple Description Video Coding" *European Signal Processing Conference*, 2005.
26. **E. Akyol**, M.Tekalp, and R. Civanlar, "Scalable Multiple Description Video Coding with Flexible Number of Descriptions", *IEEE International Conference on Image Processing*, 2005.
27. **E. Akyol**, M. Tekalp, and R. Civanlar, "Optimum Scaling Operator Selection in Scalable Video Coding", *Picture Coding Symposium*, 2004.
28. **E. Akyol**, M. Tekalp, and R. Civanlar, "Motion Compensated Temporal Filtering Within the H.264/AVC Standard", *IEEE International Conference on Image Processing*, 2004.

INVITED TALKS

- "Analog Networking", UC Riverside, March 2012 Host: Ertem Tuncel
- "On Conditions for Linearity of Optimal Estimation", ITA Workshop (poster), UCSD, Feb 2012
- "On Complexity and Delay Constrained Communications", Ozyegin University, Istanbul, Sept 2010
Host: Reha Civanlar
- "——", MERL, Cambridge, Boston, June 2010 Host: Anthony Vetro
- "——", HP Labs, Palo Alto, CA, May 2010 Host: Marcelo Weinberger
- "——", Koc University, Istanbul, Jan 2010 Host: Murat Tekalp
- "A Complexity Based Approach to Dynamic Voltage Scaling for Video Decoding Systems", Stanford University, CA, Aug 2006 Host: Bernd Girod

SERVICE

- Invited Reviewer for:
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| IEEE Trans. on Information Theory | IEEE Trans. on Communications |
| IEEE Trans. on Signal Processing | IEEE Trans. on Image Processing |
| IEEE Trans. on Circuits-Syst. for Video Tech. | IEEE Trans. on Multimedia |
| IEEE Selected Topics in Signal Processing | Elsevier Signal-Processing: Image Comm. |

HONOURS AND AWARDS

- UCSB ECE Department Dissertation Fellowship 2010.
- UCSB Senate Doctoral Student Travel Grant 2010.
- Turkish NSF (TUBITAK) Fellowship for graduate study at Stanford University, along with admission from Stanford. (Declined in favor of UCLA) (2005).
- UCLA Graduate Fellowship (2005).
- Ranked 55th among 1.5 million students in nationwide University Entrance Exam (1999).
- Ranked 1st among half million students in nationwide Science High Schools Exam (1996).

REFERENCES

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| <p>Kenneth Rose
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| <p>Murat Tekalp
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