

ENDER TEKIN

Associate Scientist

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Education

- 2008 Ph.D. in Electrical Engineering
The Pennsylvania State University, University Park, PA
Dissertation: “Information Theoretic Secrecy for Some Multiuser
Wireless Communication Channels”
- 2001 M.S. in Electrical Engineering
The Pennsylvania State University, University Park, PA
M.S. Paper: “A Look at the Theory and Applications of Orthogonal
Frequency Division Multiplexing”
- 2000 B.S. in Electrical-Electronics Engineering
Boğaziçi University, Istanbul, Turkey

Research Experience

- Associate Scientist 2015– Waisman Center, AVIATR Lab
University of Wisconsin - Madison
Madison, WI
- Associate Scientist 2013–2015 Rehabilitation Engineering Research Center
The Smith-Kettlewell Eye Research Institute
San Francisco, CA
- Research Associate 2008–2013 Rehabilitation Engineering Research Center
The Smith-Kettlewell Eye Research Institute
San Francisco, CA
- Research Assistant 2006–2007 Wireless Communications and Networking Laboratory
Department of Electrical Engineering
The Pennsylvania State University
University Park, PA

Funded Research Projects

Current Projects

Principal Investigator 08/2018-07/2019 RPB/RDPFS Innovations in Technology Low Vision Research Award
"ZoomBoard: An Affordable, Portable System to Improve Access to Presentations and Lecture Notes for Low Vision Viewers"
Goal: To provide a portable and affordable solution to student and professionals with low vision to access lecture notes and slides.

Principal Investigator 10/2016-09/2019 NIDILRR Grant 90IF0114
"Image Categorization Expert System to Facilitate Creation of Accessible Education Materials"
Goal: To enhance the process of producing accessible descriptions for textbook images for students with print disabilities.

Past Projects

Co-Principal Investigator 03/2015 – 11/2015 Wicab, Inc. "A Computer Vision-Based Sign Assistant for the BrainPort Mobile System"
Goal: To develop computer vision algorithms running on a mobile device to accurately detect exit and restroom signs for blind users using video stream from a wearable prosthetic device.

Principal Investigator 06/2013–05/2015 NIH/NEI Grant 1 R21 EY022200
"Video-based Speech Enhancement for Persons with Vision and Hearing Loss."
Goal: To address the speech perception problems of persons with combined vision and hearing impairments by using computer vision techniques to enhance the processing of audio signals, leading to the development of improved hearing aid devices.

Co-Investigator 09/2013–08/2016 NIH/NEI Grant 2 R01 EY018890
"Providing Access to Appliance Displays for Visually Impaired Users," J. M. Coughlan (PI).
Goal: To develop a computer vision system that runs on smartphones and tablets to enable blind and visually impaired persons to read appliance displays.

Research Associate 09/2012–06/2013 US Dept. of Education, Office of Special Education Programs (OSEP) Grant H327J110005
"Video Description Research & Development Center (VDRDC)," J. A. Miele (PI)

Research Associate 05/2012–06/2013 NIH/NEI Grant 2 R01 EY018345
"A Cell Phone-Based Street Intersection Analyzer for Visually Impaired Pedestrians," J. M. Coughlan (PI)

Postdoctoral Researcher 04/2008–04/2012	NIH/NEI Grant 1 R01 EY01889 “A Non-Document Text and Display Reader for Visually Impaired Persons,” J. M. Coughlan (PI)
Research Assistant 08/2006–08/2007	NSF Grant CCF-0514813 “Multiuser Wireless Security,” A. Yener (PI)
Research Assistant 08/2007–12/2007	DARPA ITMANET Program Grant W911NF-07-1-0028 “Information Theory for Mobile Ad Hoc Networks Program,” J. Andrews (PI)

Pending Projects

Collaborator	UW2020 Proposal “Enabling GPU-based Data Science” A. Gitter (PI)
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Teaching Experience

Coordinator of Laboratory Instructors 09/2005–08/2006	EE 310: Electronic Circuit Design I Department of Electrical Engineering, The Pennsylvania State University University Park, PA
Teaching Assistant 08/2002–08/2006 (12 semesters)	EE 310: Electronic Circuit Design I Department of Electrical Engineering, The Pennsylvania State University University Park, PA <i>Role:</i> Laboratory instructor

Publications & Presentations

Peer Reviewed Journal Publications:

- [1] E. Tekin, J. M. Coughlan, and D. Vásquez, “S-K smartphone barcode reader for the blind,” *Journal on Technology and Persons with Disabilities*, vol. 1, Feb. 2014. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/S-K-Smartphone-Barcode-Reader-for-the-Blind.pdf>
- [2] R. Bassily, E. Ekrem, X. He, E. Tekin, J. Xie, M. R. Bloch, S. Ulukus, and A. Yener, “Cooperative security at the physical layer: A summary of recent advances,” *IEEE Signal Processing Magazine, Special Issue on Signal Processing for Cyber-security and Privacy*, vol. 30, no. 5, pp. 16–28, Sep. 2013. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/sps-mag-coop-sec.pdf>

- [3] E. Tekin and A. Yener, "The Gaussian multiple access wire-tap channel," *IEEE Tran. Inform. Theory*, vol. 54, no. 12, pp. 5747–5755, Dec. 2008. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Gaussian-Multiple-Access.pdf>
- [4] E. Tekin and A. Yener, "The general Gaussian multiple access and two-way wire-tap channels: Achievable rates and cooperative jamming," *IEEE Tran. Inform. Theory*, vol. 54, no. 6, pp. 2735–2751, Jun. 2008. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Gaussian-June-2008.pdf>

Peer Reviewed Published Conference Proceedings:

- [1] G. Fusco, E. Tekin, N. A. Giudice, and J. M. Coughlan, "Appliance Displays: Accessibility Challenges and Proposed Solutions," in *17th International ACM SIGACCESS Conference on Computers and Accessibility*, Lisbon, Portugal, Oct. 2015. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Appliance-Displays.pdf>
- [2] G. Fusco, E. Tekin, R. Ladner, and J. M. Coughlan, "Using computer vision to access appliance displays," in *16th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS 2014)*, Rochester, NY, Oct. 2014. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Using-Computer-Vision-to-Access-Appliance-Displays.pdf>
- [3] E. Tekin, J. M. Coughlan, and H. Shen, "Real-time detection and reading of LED/LCD displays for visually impaired persons," in *IEEE Workshop Appl. Comp. Vision (WACV'11)*, Jan. 2011. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Real-Time-Detection-and-Reading-of-LED.pdf>
- [5] E. Tekin and J. M. Coughlan, "A mobile phone application enabling visually impaired users to find and read product barcodes," in *12th International Conference on Computers Helping People with Special Needs (ICCHP '10)*, Jul. 2010, PMCID: PMC2915449. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/A-Mobile-Phone-Application-Enabling-Visually-Impaired-Users.pdf>
- [6] E. Tekin and J. M. Coughlan, "An algorithm enabling blind users to find and read barcodes," in *IEEE Workshop Appl. Comp. Vision (WACV 2009)*, Snowbird, UT, Dec. 2009, PMCID: PMC2859730. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/An-Algorithm-Enabling-Blind-Users-to-Find.pdf>
- [7] E. Tekin and J. M. Coughlan, "A Bayesian algorithm for reading 1D barcodes," in *6th Canadian Conference on Computer and Robot Vision (CRV'09)*, May 2009. [Online.] Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/A-Bayesian-Algorithm-for-Reading-1D-Barcodes.pdf>
- [8] E. Tekin and A. Yener, "Secrecy sum-rates for the multiple-access wire-tap channel with ergodic block fading," in *45th Annual Allerton Conference on Communication, Control and*

Computing. Monticello, IL: Citeseer, Sep. 2007, pp. 856–863. [Online.] Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/C_TY_Allerton2007.pdf

- [9] E. Tekin and A. Yener, “The Gaussian multiple access wire-tap channel: wireless secrecy and cooperative jamming,” in *Information Theory and Applications Workshop*. IEEE, 2007, pp. 404–413. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/ET_ITW07.pdf
- [10] E. Tekin and A. Yener, “Achievable rates for two-way wire-tap channels,” in *IEEE International Symposium on Information Theory (ISIT)*, Nice, France, 2007, pp. 941–945. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Achievable-Rates-for-Two-Way.pdf>
- [11] E. Tekin and A. Yener, “Achievable rates for the general Gaussian multiple access wire-tap channel with collective secrecy,” in *Proceedings of the 44th Annual Allerton Conference on Communication, Control, and Computing (Allerton’06)*, Monticello, IL, Sep. 2006. [Online]. Available: <https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/Achievable-Rates-for-the-General-Gaussian-.pdf>
- [12] E. Tekin and A. Yener, “The Gaussian multiple access wire-tap channel with collective secrecy constraints,” in *IEEE International Symposium on Information Theory*, Seattle, WA, Jul. 2006, pp. 1164–1168. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/C_TY_ISIT2006.pdf
- [13] E. Tekin, S. Serbetli, and A. Yener, “On secure signaling for the Gaussian multiple access wire-tap channel,” in *Proc. Asilomar Conf. On Signals, Systems, and Computers*, Asilomar, CA, 2005, pp. 1747–1751. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/C_TSY_Asilomar2005.pdf

Peer Reviewed Conference Presentations:

- [1] E. Tekin, S-A Ma, and K. Yamaguchi, “Exploring Ways to Automate Image Description Production for STEM,” in *33rd Annual CSUN Assistive Technology Conference (2018)*, San Diego, CA, March 2018.
- [2] G. Fusco, E. Tekin, and J. M. Coughlan, “An Appliance Display Reader for People with Visual Impairments,” in *31st Annual CSUN Assistive Technology Conference (2016)*, San Diego, CA, March 2016. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/display_reader_csun_2016.pdf
- [3] E. Tekin, J. M. Coughlan, and H. Simon, “Visual information can aid in speech enhancement,” in *Hearing Across the Lifespan Conference (HEAL ’2014)*, Cernobbio, Italy, Jun. 2014.
- [4] E. Tekin, J. M. Coughlan, and H. Simon, “Improving speech enhancement algorithms by incorporating visual information.” in *166th Meeting of the Acoustical Society of America*, San Francisco, CA, Dec. 2013.

- [5] E. Tekin, J. M. Coughlan, and H. Shen, "An LED/LCD display reader for visually impaired users," in *26th Annual International Technology & Persons with Disabilities Conference*, San Diego, CA, Mar. 2011.
- [6] E. Tekin, J. M. Coughlan, and H. Shen, "A system for reading non-document text for persons with vision disabilities," in *25th Annual International Technology & Persons with Disabilities Conference*, San Diego, CA, Mar. 2010.

Invited Presentations and Demos:

- [1] E. Tekin, "Streamlining the image description process via machine learning," in MERI-at-a-Glance, Madison, WI, Nov. 2018.
- [2] E. Tekin, "Addressing accessibility challenges at home for blind smartphone users," in McPherson Eye Research Institute (MERI) Seminar Series, Madison, WI, Apr. 2016.
- [3] E. Tekin, "Harnessing Computer Vision to Improve Accessibility and Communication for Persons with Visual Impairments," Waisman Center Seminar, Madison, WI, Dec. 2014.
- [4] E. Tekin and J. M. Coughlan, "An algorithm enabling blind users to find and read barcodes," in *Bay Area Vision Meeting*, Berkeley, CA, Feb. 2010.
- [5] E. Tekin, "Bayesian modeling and decoding UPC-A barcodes," in *Smith-Kettlewell Brown Bag Series*, Mar. 2009.
- [6] E. Tekin, "Computer vision applications for the visually impaired," in *Envision Conference*, San Antonio, TX, Sep. 2008

Technical Reports:

- [1] G. Fusco, E. Tekin, and J. M. Coughlan, "Sign Finder Application," Smith-Kettlewell Eye Research Institute, Technical Report 2016. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/sign_finder_technical_report_-_web_version.pdf
- [2] E. Tekin and J. M. Coughlan, "BLaDE: barcode localization and decoding engine," Smith-Kettlewell Eye Research Institute, Technical Report 2012-RERC.01, Dec. 2012. [Online]. Available: https://aviatr.wiscweb.wisc.edu/wp-content/uploads/sites/150/2017/09/BLaDE_TechReport.pdf

Awards and Achievements

- Cingular Wireless Graduate Fellowship (\$5,000), 2006.
- Ranked in the top 0.01% in the Turkish National Secondary and Post-Secondary Education Placement Exams.
- American Junior High School Mathematics Exam (AJHSME) School Winner, 1993.

Service Activities

Reviewer:

Journals: IEEE Transactions on Communications; IEEE Transactions on Wireless Communications; IEEE Transactions on Information Theory; IEEE Communications Letters; Signal, Image and Video Processing; Medical Engineering & Physics; Journal of Electronic Imaging.

Conferences: International Symposium on Information Theory (ISIT); International Conference on Communications (ICC); Vehicular Technologies Conference (VTC); Wireless Communications and Networking Conference (WCNC); Computer Vision and Pattern Recognition (CVPR); Computer-Human Interaction (ACM CHI).

Review Panels: NIH Aging and Development, Auditory, Vision and Low Vision small business study section (ETTN-12)

Committees:

- Member, Information Technology Committee, Smith-Kettlewell (2013–2015).
- Member, Brown Bag and Colloquium Committee, Smith-Kettlewell (2012–2015).
- Member, Outreach Committee, McPherson Eye Research Institute, UW-Madison (2016-)
- Treasurer of the Turkish Student Association, the Pennsylvania State University (2001–2002).

Professional Memberships

IEEE Member (Student Member 2000–2008, Member 2008–).