Vita — November 2015
TODD K. MOON

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Academic Positions

2008 –	Department head, Electrical and Computer Engineering, USU
2007– 2008	Interim Department head, Electrical and Computer Engineering, USU
2007	Summer Researcher at IDA and adjunct staff, Princeton, NJ
2006	Summer Researcher at IDA and adjunct staff, Princeton, NJ
2005	Summer Researcher at IDA and adjunct staff, Princeton, NJ
2004	Summer Researcher at IDA and adjunct staff, Princeton, NJ
2003	Summer Researcher at IDA and adjunct staff, Princeton, NJ
2002–	Professor of Electrical Engineering, USU
2001–2002	Sabbatical Researcher at Institute for Defense Analysis (IDA), Princeton, NJ
1996–2002	Associate Professor of Electrical Engineering, USU
1991–1996	Assistant Professor of Electrical Engineering, Utah State University (USU)

Education

1988–1991 Ph.D. in Electrical Engineering, 1991, University of Utah
Dissertation: Parameter Estimation in Spread-Spectrum Multiple Access Systems

1987–1988 M.S. in Electrical Engineering, 1988, Brigham Young University
Thesis: Mode Characteristics and Second-Harmonic Enhancement in an Optical Fiber with Non-linear Thin-Film Coating

1981–1988 B.S. in Electrical Engineering and Mathematics (double major), 1988, Brigham Young University
Summa Cum Laude, Phi Kappa Phi, Honors Program, Sigma Xi
Honors Thesis: A Flexible Factory Controller

Other Positions

1988–1991 Research assistant, University of Utah, Salt Lake City, UT
Development and analysis of algorithms for spread spectrum multiple access communication

1988–1991 President, SMARTware, Salt Lake City, UT
Startup I developed to deploy stepper motor controller hardware, and Consulting for computer controlled manufacturing

1987–1988 Research assistant, ECE Department, BYU, Provo, UT

	Analysis of multimode optical fibers; optical bench work and numerical software
1986–1987	Research assistant, CAM Software Research Center, BYU, Provo, UT
	Analog and digital hardware design; software development for
	Integrated control of multiple manufacturing machines
1984–1986	Bob Denning and Associates, Provo, UT
	Software developer on unix platforms; system maintenance
1981–1982	President, SMART Software, Orem, UT
	Startup I formed to develop digital design and simulation software
1979–1981	Programmer, WICAT Inc., Orem, UT
	Developing interactive educational content

Administrative Accomplishments

Since 2007 I have been the department head of the Electrical and Computer Engineering Department at Utah State University, first as Interim Head and then, after a national search, as Head.

Among the administrative accomplishments of my term:

- Hired nine faculty out of a faculty of 18. Among these, there were three women, increasing the diversity of women in the department, with the hope to increase the diversity of the student populuation. uter engineering and four in electrical engineering.
- Oversaw the tenure and/or promotion of 8 faculty. A majority of the faculty are now tenured.
- Weathered the drawdown of the faculty due to the recession, resulting in the loss of three faculty positions. Also managed resource withdrawals due to the recession. As a result of conservative fiscal management, the department is in great shape financially, with strong financial reserves.
- Successfully oversaw two ABET accreditation rounds. Both accreditations resulted in six year accreditation.
- Established a vibrant electrical power program, which includes both curricular and research components.
- Built the research diversity in the department. During my tenure, faculty have established the following research laboratories:
  - RISC (Robust Intelligent Sensing and Control): autonomous unmanned vehicles
  - Micron Lab (digital systems)
  - Coven (Controls)
  - Communications Networks Laboratory — heterogeneous networking
  - Radio Frequency micro-nano electromechanical systems — reconfigurable antennas
  - USU Bridge Lab (computer architecture and design automation)
- Interacted regularly and openly with my Industry Advisory Committee
- Established a setting where all tenure track faculty have active, funded, research programs. During my tenure, four of my faculty have won NSF Career Grants.
- Maintained our online graduate program
- Seen the growth of the graduate program. We currently have 52 PhD students in the department.
- Serve on the Provost's executive department head committee, providing provost-level input and coordination.

With regard to the curriculum in the department, with the help and buy-in from the faculty, the following changes have been made:

- Revamped the curriculum to strengthen the core math requirements
- Strengthened the core circuits requirements
- Included extra programming class to strengthen programming for the electrical engineers
- Revamped the signals curriculum, pushing more content into the undergraduate level
- Completely re-worked the microprocessor class to reflect modern technologies
- Significantly strengthened the writing component of the curriculum by including an additional writing class, and strengthening the teaching of writing within the senior project by hiring English faculty to teach this.
- Revised the senior project to make it more flexible and a deeper design experience.
- Established clear flow charts to help students understand degree requirements, leading to more timely graduation

Government Service

From 2001 through 2007 I worked most summers for the Center for Communications, a branch of the Institute for Defense Analysis based in Princeton University, where I was (and am) adjunct staff. In that capacity, I worked in a classified setting on problems of interest to the federal government related to communications and cryptography.

Areas of Current Research Interest: Error correction coding. Iterative decoding and signal processing. Statistical signal processing.

Publications

Books

1. Todd K. Moon, *Error Control Coding: Mathematical Methods and Algorithms*, Wiley, 2005. (800 pp + web page + 240 pp. solution manual)
2. Todd K. Moon and Wynn C. Stirling, *Mathematical Methods and Algorithms for Signal Processing*, Prentice-Hall, 2000. (937 pp. + CD-ROM + 268 pp. solution manual.)

Journal Papers

1. T.K Moon, J.H. Gunther, "Continuum-State Hidden Markov Models with Dirichlet State Distributions," *Journal of Aerospace Information Systems*, doi 10.2514/1.I010260. `arc.aiaa.org/doi/abs/10.254/I010260`
2. Derek West, Jake Gunther, Todd Moon, "Maximum Likelihood Estimation of Ground Reflectivity from Stripmap-SAR Data," submitted to the IEEE Trans. on Aerospace and Electronic Systems in July 2014. Being revised for resubmission.
3. T. Moon, "The Volition of Intelligence," *Proceedings of the Utah Academy of Sciences, Arts, and Letters*, 2014.
4. C. Berrett, G. Williams, T.K. Moon and J.H. Gunther, "A Bayesian Nonparametric Model for Temperature-Emissivity Separation of Long-Wave Hyperspectral Images," *Technometrics*, v. 56, no. 2, pp. 200-211, 2014. DOI:10.1080/00401706.2013.869262
5. J.H. Gunther C. Swenson, C. Fish, and T.K. Moon, "Reliable Space-to-Earth Communication as a Secondary Service in the 460-470 MHz Band," *International Journal of Satellite Communications and Networking*, DOI: 10.1002/sat.1072,
http://dx.doi.org/10.1002/sat.1072
6. M.R. Stites, J.H. Gunther, T.K. Moon, and G.P. Williams, "Using physically modeled synthetic data to assess hyperspectral unmixing approaches," Remote Sensing, v. 5, no. 4, pp. 1974–1997, 2013. doi: 10.3390/rs5041974.

7. T.K. Moon, J.H. Gunther, C. Broadus, C. Hou, N. Nelson, "Turbo Processing for Speech Recognition," *IEEE Trans. Syst., Man and Cyber., Part B*, Jan. 2014, v. 44, no. 01, 2014, pp. 83–91. DOI:10.1109/TCYB.2013.2247593. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6495711.

8. T.K. Moon, J.H. Gunther, "Multiple-Access via Turbo Joint Equalization," *IEEE Trans. Comm.*, v. 60, no. 10, Oct. 2013, pp. 3001–3010. DOI 10.1109/TCOMM.2012.070912.110191. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6241377.

9. C.S. Grant, T.K. Moon, J.H. Gunther, M.R. Stites, G.P. Williams, "Detection of amorphously shaped objects using spatial information detection enhancement (SIDE-)," *IEEE J. of Selected Topics in Applied Earth Obsverations and Remote Sensing* (JSTARS), v. 5, no. 2, pp. 478-487, 2012, DOI 10.1109/JSTARS.2012.2186284. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6153396.

10. J.H. Gunther and T.K. Moon, "Entropy Minimization for Solving Sudoku," *IEEE Trans. Sig. Proc.*, v. 60, no. 1, pp. 508–513, 2012. DOI 10.1109/TSP.2011.2169253 http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6025312.

11. M.R. Bastian, J.H. Gunther, T.K. Moon, "A simplified natural gradient learning algorithm," *Advances in Articial Neural Systems*, v. 2011, pp. 1–9, 2011. http://www.hindawi.com/journals/aans/2011/407497

12. T.K. Moon, J. Gunther, "Transform-based computation of the distribution of a linear combination of random variables over arbitrary finite fields," *IEEE Signal Processing Letters*, Dec. 2011, v. 18, no. 12, pp. 737–740.

13. T.K. Moon, J. Gunther, "Probability of Even Parity of Soft Bits," *IET Signal Processing Journal*, vo. 5, no. 6, pp. 603–611, Sep. 2011. DOI 10.1049/iet-spr.2010.0194. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6024495.

14. Flake, J., T.K. Moon, M. McKee, J.H. Gunther, "Application of Relevance Vector Machines to Canal Flow Prediction in the Sevier River Basin," *Agricultural Water Management*, v. 96, pp. 208–214, 2010.

15. Marchant, C.C., Moon, T.K., and Gunther, J.H., "An iterative least square approach to elastic-lidar retrievals for well-characterized aerosols," *IEEE Trans. Geoscience and Remote Sensing*, v. 48, no. 5, pp. 2430–2444, 2009. DOI 10.1109/TGRS.2009.2038903. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5404408.

16. Gunther, J.H. and Moon, T.K., "Burst mode synchronization of QPSK on AWGN channels using kurtosis," *IEEE Trans. Com.*, v. 57, no. 8, pp. 2453–2462, 2009. DOI 10.1109/TCOMM.2009.08.070338. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5201038.

17. Contreras, A.A., Moon, T.K., Dasu, A., and Gunther, J.H., "Micronetworking: reliable communication on 3D integrated circuits," *Elect. Letters*, v. 46, no. 4, pp. 291–293. DOI 10.1049/el.2010.2193. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5418561.

18. T.K. Moon and J.H. Gunther and J. Kupin, "Sinkhorn Solves Sudoku," *IEEE Trans. Info. Theory*, v. 55, no. 4, Apr. 2009, pp. 1741–1746. DOI 10.1109/TIT.2009.2013004. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4804943.

19. J.H. Gunther and T.K. Moon, "Minimum Bayes Risk Adaptive Linear Equalizers," *IEEE Trans. Sig. Proc.*, v.57, no. 12, pp. 4788–4799, 2009. DOI 10.1109/TSP.2009.2026105. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5153297.

20. J.H. Gunther and T.K. Moon, "Minimum symbol error rate carrier phase recovery of QPSK," *IEEE Trans. Sig. Proc.*, v. 57, no. 8, Aug. 2009, pp. 3101–3107. DOI 10.1109/TSP.2009.2020746. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4813246.

21. T.K. Moon and J.H. Gunther, "Partial specification frequency-domain least-squares filter design and systems identification," *IEEE Sig. Proc. Letters*, v. 15, no. 1, Jan 2008, pp. 53–56.

DOI 10.1109/LSP.2007.911139.
http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4418400.

22. J.H. Gunther, D. Keller, and T.K. Moon, "A generalized BCJR algorithm and its use in iterative blind channel identification," *IEEE Sig. Proc. Letters*, v. 14, no. 10, pp. 661–664, Oct. 2007. DOI 10.1109/LSP.2007.898316. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4303066.

23. T.K. Moon, J.H. Gunther, J. Crockett and O. Chauhan, "Iterative decoding using Eigenmessages," *IEEE Trans. Com.*, v. 57, no. 12, Dec. 2009, pp. 3618–3628. DOI 10.1109/TCOMM.2009.12.050230. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5351658.

24. J.H. Gunther and M. Ankapura and T.K. Moon, "A Generalized LDPC Decoder for Blind Turbo Equalization," *IEEE Trans. Sig. Proc.* 2007, v. 53, no. 10, pp. 3847–3856. DOI 10.1109/TSP.2005.855396. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1510991.

25. T.K. Moon, "On general linear block code decoding using the sum-product iterative decoder," *IEEE Comm Lett.*, v. 8, no. 6, June 2005, pp. 383–385. DOI 10.1109/LCOMM.2004.828183. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1306428.

26. T.K. Moon and J.H. Gunther, "On the equivalence of two Welch-Berlekamp key equations and their error evaluators," *IEEE Trans. on Info. Theory*, v. 51, no. 1, Jan. 2005, pp. 399–401. DOI 10.1109/TIT.2004.839520. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1377522.

27. T.K. Moon, "Bit-level erasure decoding of Reed-Solomon codes over $GF(2^m)$" *IEICE Trans. Commun.*, v. E85-B, n. 1, pp. 1–9.

28. T.K. Moon and J.H. Gunther, "Contravariant adaptation on structured matrix spaces," *Signal Processing*, v. 82, pp. 1389–1410, 2002. http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=1762816803&_sort=r&_st=13& view=c&_acct=000022310&_version=1&_urlVersion=0& _userid=464852&md5=f36b49c58e7a7f2434a00fcaadd30eac&searchtype=a

29. Todd K. Moon, "Maximum likelihood binary shift-register synthesis from noisy observations," *IEEE Trans. Info. Th.*, July 2002, pp. 2096–2104. DOI 10.1109/TIT.2002.1013152. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1013152.

30. Chet Lo and Todd Moon, "Bandwidth efficient digital communication with wavelet approximations," *J. Comm. and Networks*, v. 4, no. 2, June 2002, pp. 97–101. DOI 10.1109/JCN.2002.6596900. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6596900.

31. Todd K. Moon, "Exact reconstruction of a signal from samples of its integral," *Electronics Letters*, June 8, 2000, pp. 1079–1081. DOI 10.1049/el:20000772. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=852214.

32. Todd K. Moon and Shriharsha Veeramachaneni, "Linear Feedback Shift Registers as Vector Quantization Codebooks," *Electronics Letters*, 28 Oct., 1999, v. 35, no. 22, pp. 1919–1920. DOI 10.1049/el:19991335. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=811051.

33. T.K. Moon, "Similarity Methods in Signal Processing," *IEEE Trans. Sig. Proc.*, April 1996, v. 44, no. 4, pp. 827–833. DOI 10.1109/78.492536. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=492536

34. T.K. Moon, "The Expectation-Maximization Algorithm in Signal Processing," *IEEE Signal Processing Magazine*, v. 13, no. 6, Nov. 1996, pp. 47–60. DOI 10.1109/79.543975. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=543975.

35. T. K. Moon, R. L. Frost, W. C. Stirling, "An Epistemic Utility Approach to Coordination in the

Prisoner's Dilemma," *BioSystems*, pp. 167–176, vol. 37, 1996.

36. M.K. Simon and M.M. Shihabi and T.K. Moon, "Optimum Detection of Tones Transmitted by a Spacecraft," JPL TDA Progress Report 42-123, Nov. 15, 1995. `http://tmo.jpl.nasa.gov/tmo/progress\_report/42-123`.
37. T.K. Moon, Z. Xie, C. K. Rushforth, R. T. Short, "Parameter Estimation in a Multi-User Communication System," *IEEE Trans. Com.*, v. 42, no. 8, Aug. 1994, pp. 2553–2560. DOI 10.1109/26.310615. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=310615`
38. T. K. Moon, S. E. Budge, W. C. Stirling, J. B. Thompson, "Epistemic Decision Theory Applied to Multiple-Target Tracking," *IEEE Trans. Systems, Man, and Cybernetics*, v. 24, no. 2, Feb. 1994, pp. 234–245. DOI 10.1109/21.281423. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=281423`.
39. T. K. Moon and S. E. Budge, "Classification using Set-Valued Kalman Filter and Levi's Decision Theory," *IEEE Trans. SMC*, v. 24, no. 2, Feb. 1994, pp. 313–318. DOI 10.1109/21.281429. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=281429`.
40. Z. Xie, C. K. Rushforth, R. T. Short, T. K. Moon, "Joint Signal Detection and Parameter Estimation in Multiuser Communications," *IEEE Trans. Com.*, v. 41, no. 8, Aug. 1993, pp. 1208–1216. DOI 10.1109/26.231964. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=231964`.

Conference Papers (refereed, with archived proceedings)

1. Jacob H. Gunther, T. K. Moon "Incorporating Signal History into Transfer Logic for Two-Path Echo Cancelers," 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 9-12, 2015 (proceedings still to be posted on archive).
2. Mohammad Shekaramiz, T. K. Moon, J.H. Gunther, "On the Block-Sparse Solution of Single Measurement Vectors," 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 9-12, 2015 (proceedings still to be posted on archive).
3. David Neal, T.K. Moon, J.H. Gunther, "Correlated Maximum Likelihood Temperature/Emissitivity Separation of HyperspectralImages," 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 9-12, 2015 (proceedings still to be posted on archive).
4. J. Gunther, N. Ruben, T. Moon, "Model-Based (Passive) Heart Rate Estimation Using Remote Video Recording Of Moving Human Subjects Illuminated By Ambient Light," IEEE International Conference on Image Processing (ICIP), Quebec, Canada, Sept. 2015. (proceedings still to be posted on archive)
5. J. Gunther, T. Moon, "Bind Acoustic Echo Cancellation Without Double-Talk Detection, IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), New Paltz, New York, Oct. 2015. (proceedings still to be posted on archive)
6. Todd K. Moon, J.H. Gunther, McKay Bonham, "Excision of Discontinuous-Frequency Interference Signal with Harmonic Structure," 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 9-12, 2015 (proceedings still to be posted on archive).
7. J.H. Gunther, T.K. Moon, "Nine C Programming Labs to Turn Students into Filtering and Signal Analysis Experts", 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).
8. T.K. Moon, J.H. Gunther, McKay Bonham, Gustavious P. Williams, "Coherent Combination of Signals From Diverse Sensors," 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).
9. Mohammad Shekaramiz, T.K. Moon, J.H. Gunther, "On The Block-Sparsity Of Multiple-Measurement Vectors," 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).
10. Trace Griffiths, Gene Ware, T.K. Moon, "Signal Processing Techniques for Enhancing Multispectral Images of Ancient," 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).

11. T.K. Moon, David Neal, J.H. Gunther, G.P. Williams, "Temperature Emissivity Separation: Estimation with a Parameter Affecting Both the Mean and Variance of the Observation," 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).
12. T.K. Moon, J.H, Gunther, G.P. Williams, "Extracting The Fundamental Frequency of a Nonlinear Chirp Signal with Modulated Harmonic Structure Using ML, Target Tracking, and the Viterbi Algorithm," 2015 IEEE Signal Processing/Signal Processing Education Workshop, Snowbird, Aug. 9-12, 2015 (proceedings still to be posted on archive).
13. Mohammad Shekaramiz, Todd K. Moon, Jacob H. Gunther, "Hierarchical Bayesian Approach for Jointly-Sparse Solution of Multiple-Measurement Vectors," presented at the 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2-5, 2014. DOI 10.1109/ACSSC.2014.7094813. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7094813`.
14. Todd K. Moon, Jacob H. Gunther, "Quasicontinuous State Hidden Markov Models Incorporating State Histories," presented at the 48th IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2-5, 2014. DOI 10.1109/ACSSC.2014.7094843. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7094843`.
15. J. Gunther, C. Swenson, T. Moon, C. Fish, T. Parris, D. Thompson, T. Petersen, "Orbit refinement for software defined radio for space applications," IEEE International Conference on Acoustics, Speech, and Signal Processing, pp. 2169–2173, May 5–9, 2014. doi: 10.1109/ICASSP.2014.6853983 `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6853983&isnumber=6853544`
16. J. Gunther, J. Hunsaker, H. Anderson, T. Moon, "Sparse reconstruction of equivalence classes of moving targets using single-channel synthetic aperture radar," IEEE International Conference on Acoustics, Speech, and Signal Processing, pp. 3943–3947, May 5–9, 2014, doi: 10.1109/ICASSP.2014.6854341. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6854341&isnumber=6853544`
17. Chad Knight ; Jake Gunther ; Todd Moon; "Model-based 3D SAR reconstruction." Proc. SPIE 9093, Algorithms for Synthetic Aperture Radar Imagery XXI, 909308 (June 13, 2014); doi:10.1117/12.2050832. `http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=1882644&resultClick=1`
18. Jacob Gunther, Josh Hunsaker, Hyrum Anderson, Todd Moon, "Estimating moving target information using single-channel synthetic aperture radar (SAR)." Proc. SPIE 9093, Algorithms for Synthetic Aperture Radar Imagery XXI, 90930K (June 13, 2014); doi:10.1117/12.2050076. `http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=1882653&resultClick=1`
19. J. Gunther, T.K. Moon, "Sparse representation and epoch estimation of voiced speech," IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, Mohonk Mountain House, New Paltz, New York, 20–23 Oct., 2013.
20. C. Knight, J. Gunther, T. Moon, "Anisotropic model-based SAR processing," Proceedings of the SPIE, Radaor Sensor Technology XVII v. 8714, id. 87141M, May 31, 2013, doi: 10.1117/12.201585 (9 pp). url: http://proceedings.spiedigitallibrary.org/proceeding.aspx?articledid=1693552
21. T.K. Moon, J.H. Gunther, Candace Berrett, and G.P. Williams, "Hierarchical Bayesian Sparse Source Separation of Hyperspectral Signals," IEEE Asilomar Conf. on Signals, Systems, and Computers, November 2013. DOI 10.1109/ACSSC.2013.6810416. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6810416`.
22. J. Gunther, T.K. Moon, G. Williams, M. Stites, "Separating temperature, emissitivty and downwelling radiance in thermal infrared pure-pixl hyperspectral images," IEEE Asilomar Conf. on Signals, Systems, and Computers, Nov. 2013.
23. T.K. Moon and J.H. Gunther, "Forward/Backward State and Model Parameter Estimation for Continuum-State Hidden Markov Models (cHMM) with Dirichlet State Distributions," IEEE Asilomar Conf. on

Signals, Systems, and Computers, November 2013. DOI: 10.1109/ACSSC.2013.6810604 http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6810604

24. T.K. Moon and J.H. Gunther, "Signal processing using vector space methods: an introspective," Digital Signal Processing and Signal Processing Education Meeting, Aug 11-14, 2013, pp. 296–301. DOI: 10.1109/DSP-SPE.2013.6642607. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6642607.
25. T.K. Moon and J.H. Gunther, "Message passing soft decoding of linear block codes over arbitrary finite fields," Digital Signal Processing and Signal Processing Education Meeting, Aug. 11-14, 2013, pp. 210–215. doi: 10.1109/DSP-SPE.2013.6642574. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6642574.
26. J.H. Gunther and T.K. Moon, "Joint linear prediction and epoch estimation of voiced speech using a basis where the prediction residual can be sparsely represented," Digital Signal Processing and Signal Processing Education Meeting, Aug. 11-14, 2013, pp. 107-111. doi: 10.1109/DSP-SPE.2013.6642592.
27. J.H. Gunther and T.K. Moon, "Synchronization and demodulation programming projects to accompany a first course on digital communications," Digital Signal Processing and Signal Processing Education Meeting, Aug. 11-14, 2013, pp. 311–316. doi: 10.1109/DSP-SPE.2013.6642610.
28. T.K. Moon, J.H. Gunther, "Continuum-State Hidden Markov Models with Dirichlet State Distributions, Part I: Model and Forward State Estimation," International Conference on Acoustics, Speech, and Signal Processing, may 26-31, 2013, pp. 6595–6599. doi: 10.1109/ICASSP.2013.6638937. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6638937.
29. Crookston, N. and Gunther, J. and West, R. and Moon, T.K., "Synthetic aperture radar tool and libraries," *IEEE Radar Conference (RADAR)*, May, 2012, pp. 968–972.
DOI: 10.1109/RADAR.2012.6212277
http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6212277
30. J. Gunther and T. Moon and G. Williams, "Adaptive Learning for the Extraction of Intrinsic Spectral Signatures in HSI Data for Solid Material Detection and Classification," *Hyperspectral/Polarimetric Community Collaboration Workshop*, July 2012.
31. J.H. Gunther, C. Knight, T. K. Moon, "Breaking the Isotropic Scattering Assumption in Wide-Beam Stripmap SAR Imaging," Asilomar Conf. on Signals, Systems, and Computers, November 2012.
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- T.K. Moon, J.H. Gunther, M. Stites, C. Grant, "GEOM-ICA: Incorporating geometric and other information into hyperspectral imagery independent componnent analysis (annual report)," University and Industry Technical Interchance Meeting (UITI), Department of Energy, Dec. 2009.
- T.K. Moon, J.H. Gunther, M. Stites, C. Grant, "GEOM-ICA: Incorporating geometric and other information into hyperspectral imagery independent componnent analysis (annual report)," University and Industry Technical Interchance Meeting (UITI), Department of Energy, Dec. 2008.
- T.K. Moon, J.H. Gunther, M. Stites, C. Grant, "GEOM-ICA: Incorporating geometric and other information into hyperspectral imagery independent componnent analysis (annual report)," University and Industry Technical Interchance Meeting (UITI), Department of Energy, Dec. 2007.

Invited Conference Presentations

- D. Rawlings, W. Smith, G. Williams, J. Gunther, T.K. Moon, "Extracting atmospheric profiles from hyperspectral data using particle filters," DOE University-Industry Technical Interchange Meeting, June, 2013.
- G. Williams, T. Moon, J. Gunther, "Solids identification using hyperspectral imagery: extracting reliable signatures from a sea of variability," DOE University-Industry Technical Interchange Meeting, June, 2013.
- J. Gunther, T.K. Moon, "Recent signal processing research and Utah State University," Synthetic Aperture Radar Group, March 2013.

Book Chapters

- J. Gunther, T.K. Moon, "Minimum symbol error rate pulse design with a robustness to timing jitter," in *Communications Systems: New Research*, Nova Science Publishers, 2013, pp. 287–310.

Other (Non-refereed)

- Haupt, R.L. and Moon, T.K., "On trust," *IEEE Antennas and Propagation Magazine*, v. 43, no. 1, pp. 136–137. DOI 10.1109/MAP.2001.920026. `http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=920026`.

Book Chapters

- J.H. Gunther and T.K. Moon, "Minimum symbol error rate pulse designs with robustness to timing jitter," *Communication Systems: New Research*, Nova Publishers, 2013.

Proposals Submitted and Awarded

- T.K. Moon, "Extracting Geometric Information from Convolutive Blind Source Separation for Seismic Subsurface Exploration," NASA, $13,000 (funded), 2014
- T.K. Moon, J.H. Gunther (USU), G. Williams, S. Reese, C. Berrett (BYU), "RF sensing and signal processing for monitoring proliferation activity," DOE, $750,000 (funded), 2014
- J.H. Gunther and T.K. Moon, "GEOM-ICA: Incorporating geometric and other information into hyperspectral independent component analysis," DOE, approx. $300,000.
- T.K. Moon and J.H. Gunther, "Distributed Communications and Control for Multiple Minature Unmanned Air Vehicles," NSF award 0428004 (Sept. 1, 2004 — Aug. 31, 2009), subcontract through BYU. Our portion: $165,347.
- T.K. Moon, Research Directed at Finding Fast Iterative Decoding Algorithms, College of Engineering, USU, $25,000.
- T.K. Moon, Support for GIFTS program (funding from SDL): approx. $33,000. Funded 2000.
- T.K. Moon, "Blind Source Separation for Data Fusion," SDL IR&D grant Phase II, $15,000. Funded 2000.
- J. Powell (PI), T.K. Moon (Co-I), and D. Watson (Co-I), "Analytic Prediction of Emergent Dynamics for ANT Systems," DARPA, Funded $485,090. (three years).
- S. Budge and T.K. Moon (Co-I), "Sorenson Development Research contract," 2000, $266,248. (However, the funding source later decided not to provide funding.)
- T. K. Moon, "High-frequency water level sensor," Bureau of Reclamation. $15,000. Funded 1999.
- T. K. Moon, "Blind Source Separation for Data Fusion," SDL ($30,000) Also, $10,000 for development of algorithms for active control of interferometer stabilization mirror. Funded 1999.
- Scott Budge (PI) and T.K. Moon (co-I) "Sorenson Development Research contract," $\approx$ $250,000. Funded 1999.
- D. Watson (PI) and T.K. Moon (participant), "Development of AIC controllers for Aircraft Wiring Monitoring," $\approx$ $75,000 from SBIR (one month of support for me.) 1998
- T.K. Moon, "Bandwidth-efficient modulation using wavelet waveforms," US AFOSR, 1998, $25,000 (follow-on)
- T.K. Moon, "Bandwidth-efficient modulation using wavelet waveforms," US AFOSR, 1997, $25,000
- S. Cannon (PI) and T.K. Moon, "Software design for 8051 microcontrollers," Kirkland AFB, 1995. approx. $30,000.
- T.K. Moon, "Wavelets for Audio Data Compression," Megahertz Corp., 1995, $14,495.
- T.K. Moon, "Intelligent Canal Control," 1994, Utah Mineral Lease, $42,400.
- T. K. Moon, "Self-Adaptive Control of Irrigation Canals," Mineral Lease, 1994, $37,800.
- T. K. Moon, R. Gunderson, et al., "Vibration Isolation in Long Arm Robotics," INEL, 1994, $4950.

- T. K. Moon, "Wavelet Waveforms for Efficient Data Transmission", Spendlove Foundation, 1993, $47,030.
- T. K. Moon "Academic Program Enhancement for the EE 271 Lab Class," USU Provost Office, 1992, $9075.
- T. K. Moon, "Use of Wavelets for Transmission in Bandwidth-constrained Channels," USU, 1993, $14,769.
- T. K. Moon, "Use of Wavelet Transforms for Feature Extraction in Speech Processing," USU, 1992, $14,510.

Research Reports

- T.K. Moon, "Toeplitz Systems," CCR Working Paper, Sept. 2002
- H. Fitch, L. Liporace, T.K. Moon, W. Steward, S. Wang, "Choose a Number," CCR Working Paper, Sept. 2003.
- F. Koch, M. Quirk, T.K. Moon, "Removing narrow-band interference from complex signals," CCR Working Paper, Nov. 2001.
- J. Kupin and T.K. Moon, "Finding lines with HMMs," CCR Working Paper, Sept. 2003.
- L. Liporace and J. Kupin, "Modem preambles," CCR Working Paper, June 2002.
- T. Moon, "SVMs with missing data," CCR SCAMP Paper, Sept. 2002.
- T. Moon, "Notes on geolocation," CCR Note, Sept. 2003.
- T.K. Moon, J. Solinas, S. Spence, L. Liporace, "Iterative Decoding," CCR SCAMP Paper, Aug. 2003.
- D. Watson and T. Moon and J. Powell, "Analytic Prediction of Emergent Dynamics for ANT Systems," final research report submitted to AFOSR, May 2003.
- T. Moon, "Design of a feedforward control for a scanning interferometer," Submitted to Space Dynamics Laboratory, May 23, 2001. (41 pages)
- T.K. Moon and C. Lo, "Wavelet Modulation and Transmission Through Fading Channels," final research report submitted to AFOSR, May 2000.
- T. Moon, "Feedforward control for mirror control for an interferometer: An introduction with examples," Submitted to Space Dynamics Laboratory Dec 22, 2000.
- G.W. Cantwell, D.E. Bingham, S.E. Budge, T.K. Moon, "GIFTS Data Compression Algorithm Development," interim report submitted to UW/NASA, 2000.
- T.K. Moon and C. Lo, "Wavelet Modulation for bandwidth-efficient and fading resistant modulation for ARTM," interim research report submitted to AFOSR, Oct 1998.
- T.K. Moon and R. Rallison, "A Blind-Source Separation Approach to Data Fusion," report submitted to Space Dynamics Laboratory for IR/D grant, May 2000.
- T.K. Moon and C. Lo, "Wavelet Modulation and Transmission Through Fading Channels," final report submitted to AFOSR for grant F49620-99-1-0024, May 2000.
- T. K. Moon, "Interim report on wavelet waveform signalling," to AFOSR, for grant F49620-99-1-0024 Dec. 1998.
- "Identification of Chemical Shell Contents by Acoustic Signal Processing," T.K. Moon, F. Dailami, G. Wheeler, P. Wheeler, INEL, August 1996.

- M.K. Simon, M.M. Shihabi, T.K. Moon, "Optimum Detection of Tones Transmitted by a Spacecraft," JPL Report, 1995.
- "Summary of Operations, Protocols, and Scenarios for GSM and SS7," Research summary for NASA JPL Summer Faculty Fellow program, August 1995.
- "WesTest Speech Recognition Project, Technical Report," Submitted to WesTest Engineering, July 1994.
- "WesTest Speech Recognition Project Report," Submitted to WesTest Engineering, July 1994.
- "Active Long-Arm Stabilization Using a Voice Coil Actuator: A Feasibility Study," T. K. Moon, G. Olsen, B. Hancey, P. Van Wirt, D. Madsen. Submitted to INEL, Sept. 1994.
- "Wavelet Waveforms for Efficient Digital Communications, Interim Research Report," Submitted to Spendlove Foundation, Sept. 1994.
- *SMC User's Manual*, August 1993.

Teaching Development/Support I have had the opportunity of teaching a variety courses, which helps me appreciate the relationships between the classes and provide students with insights from a more systematic perspective. My teaching experience has been principally in the area of signals and systems, including signals, signal processing, communications, controls, information theory, and error control coding.

My passion is curiosity, and teaching provides much to be interested in. My undergirding motivation in teaching a topic is to help students understand better and more thoroughly than I did when I first learned the topic.

Courses Taught

- Digital communications I
- Digital communications II
- Error Correction Coding
- Mathematical methods for signals and systems
- Detection and estimation theory
- Convex Optimization
- Information Theory
- Stochastic processes
- Digital Signal Processing I
- Digital Signal Processing II
- Circuits and Signals/Signals and Systems
- Probability for Engineers
- Control System Design I
- Digital Control Systems
- Linear multivariable control
- Digital Systems Design (service course for other departments)
- Digital Systems Design I (for ECE students)
- Speech processing (special topics course)
- Wavelet signal processing (special topics course)
- Bayesian methods for signal processing (graduate special topics course)
- Honors course: "Chaos, fractals, and other patterns of modern computation"
- Honors course: "The limits of possibility"

Society Memberships and Professional Service

- General Conference Chair, IEEE Signal Processing/SP Education Workshop, August 2015.
- NSF Review Panel Member, 2015.
- Member, IEEE Signal Processing Theory and Methods (SPTM) Committee, starting November, 2013.

- Financial Chair, International Conference on Acoustics, Speech, and Signal Processing 2001. Responsible for budgets and expenditures of the major international conference of the IEEE Signal Processing Society meeting, to be held in Salt Lake City in 2001. (Conference registrants are expected to exceed 2000).
- Finance and Registration Chairman, IEEE 8th DSP Workshop, 1998. Responsible for all financial aspects, including budget and expenditures, as well as registration. (Conference registrants exceeded 160).
- Have served successively in the Utah Section of Signal Processing/Communication Society as vice-chair, chair, and treasurer.
- Member IEEE signal processing and information theory societies.
- Member Sigma Xi, Tau Beta Pi
- Technical Program Chair, ASEE Rocky Mountain Section Conference, 1997
- Paper reviewer for the following journals and conferences:
  - ICASSP 2015, ICASSP 2016
  - Remote Sensing
  - Codes and Designs
  - International Conference on Acoustics, Speech, and Signal Processing
  - International Conference on Communication
  - International Symposium on Circuits and Systems
  - IEEE Transactions on Wireless Communications
  - IEEE Transactions on Systems, Man and Cybernetics
  - IEEE Transactions on Fuzzy Systems
  - IEEE Transactions on Communications
  - Radio Science
  - IEEE Transactions on Vehicular Technology
  - IEEE Transactions on Signal Processing
  - IEEE Signal Processing Letters
  - IEEE DSP Workshop
  - IEEE Communications Letters
  - IEEE Wireless Communications Letters
  - IEEE Transactions on Geoscience and Remote Sensing
  - IEEE Journal of Special Areas in Communications
  - IEEE Transactions on Systems, Man, and Cybernetics, A
  - Proceedings of the Royal Soceity A
  - Journal of Optimization Theory and Applications
  - Vechicular Technology Conference
  - International Symposium on Turbo Codes and Iterative Information Processing
  - ETRI Journal
  - Optical Engineering
  - Cryptologia
  - European Transactions on Telecommunications
  - International Conference on Computational Advances in Multi-sensor Adaptive Signal processing
- Book reviewer for Prentice-Hall, McGraw-Hill, Wiley.

Awards

- BYU ECE Department "Honored Alumnus" 2015.
- Senior Member of IEEE, 2001.
- Electrical and Computer Engineering Dept. "Outstanding Teacher of the Year," 2006–2007
- Electrical and Computer Engineering Dept. "Outstanding Advisor of the Year," 99–00

- Electrical and Computer Engineering Dept. "Outstanding Researcher of the Year," 98–99
- Electrical and Computer Engineering Dept. "Outstanding Advisor of the Year," 96–97
- Electrical and Computer Engineering Dept. "Outstanding Advisor of the Year," 97–98
- Electrical and Computer Engineering Dept. "Outstanding Teacher of the Year," 95–96
- College of Engineering "Teacher of the Year," 95–96
- USU Robbins Award "Teacher of the Year Finalist," 1996
- ASEE Rocky Mountain Section "Dow Outstanding New Faculty Award," 1997

Other

- Scoutmaster for the Boy Scouts of America, 1997–1999, 2012-2015.
- NASA JPL Summer Faculty Fellow, 1995.
- Computer skills: C/C++, MATLAB, MATHEMATICA, MAPLE, MAGMA, Perl, Python, Linux/Unix, etc.

Personal Completed Top of Utah Marathon, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, and St. George Mathathon 2006

Consulting

- Raytheon Applied Signal Technology, Sunnyvale, CA, 2015.
- Rincon, 2014
- Applied Signal Technology, 2014
- Expert Witness for Dechert, LLP, 2014. Cellular communications, compressed digital audio data.
- Expert Witness for Dechert, LLP, 2012. High Definition Television.
- Expert Witness for Weil, Gotshall & Manges, Washington, D.C. and others, 2011, 2012. High Definition Digital Television.
- Expert Witness for Fish and Richardson, Washington, D.C., 2010, 2011. High Definition Digital Television.
- Expert Witness for Weil, Gotshal & Manges, Washington, D.C., 2011, 2012.
- Expert Witness for Baker and Daniels, Washington, D.C., 2011, 2012.
- Applied Signal Technolgy, Sunnyvale, CA 2009–2010
- Beckton-Dickenson, Salt Lake City, UT
- 3-Com, Salt Lake City, UT (pro bono)
- Wilson Sansini, Palo Alto, CA 1996
- Megahertz Corporation, Salt Lake City, UT, 1995. Investigation of wavelet-based audio data compression algorithms.
- USU Foundation, 1995. Development of Reed-Solomon encoder/decoder in C++ for data compression project.
- USU Foundation, 1994. Exploration of fast algorithms for tomographic image reconstruction.
- Campbell Scientific, Logan, UT, 1995. Advice on digital filter design.
- WesTest Engineering, Bountiful, UT, 1994. Speech Recognition Development Project.
- AeroTrans, Springville, UT, 1987–1991. Multi-axis controller hardware/software.
- Creative Machine Tool Corp., Provo, UT, 1994, Machine tool refurbishment.