

Abraham J. Wyner

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Citizenship: United States

Education

Stanford University, Stanford, CA. Ph.D., Statistics, June 1993. Advisor: Ani Adhikari.

Yale University, New Haven, CT. BS, Mathematics, May 1988. Graduated magna cum laude, with distinction in the major.

Academic Employment

Wharton School, University of Pennsylvania, Philadelphia, PA. *Full Professor of Statistics*, July 1, 2013. *Chair, Undergraduate Program in Statistics*.

Wharton School, University of Pennsylvania, Philadelphia, PA. *Associate Professor of Statistics*, September 2005-2013. *Chair, Undergraduate Program in Statistics*.

Wharton School, University of Pennsylvania, Philadelphia, PA. *Assistant Professor of Statistics*, September 1998-2005.

University of California at Berkeley, Berkeley, CA. *Visiting Assistant Professor of Statistics*, September 1995- June 1998.

Stanford University, Stanford, CA. *Acting Assistant Professor of Statistics*, September 1993- June 1995.

Non-Academic Employment

IBM Thomas J. Watson Research Center, Yorktown Heights, NY. *Research Associate*, Speech Recognition Group. June 1989-August 1989.

AT&T Bell Laboratories, Murray Hill, NJ. *Consultant*, Data Compression Lab. June 1987-present.

Awards

- National Science Foundation (NSF) Post-Doctoral Fellowship in the Mathematical Sciences, 1995-1998
- National Science Foundation Fellowship, 1989-1991

- Hertz Foundation Award, 1988
- Abrams Award, Stanford Statistics Department, 1988
- Anthony D. Stanley Prize for Excellence in Mathematics, 1988

Professional Activities

Member of NSF statistics expert panel 2003. Referee for NSF grant proposals, Israel-US Bi-National Science Foundation. Referee for numerous articles in many journals including the Annals of Statistics, IEEE Transactions on Information Theory, Machine Learning, Annals of Probability, Annals of Applied Probability, Journal of Computational Biology, Computer Journal, Journal of Information Retrieval, Statistical Science, Annals of Applied Statistics, Geographical Review Letters, NIPS, AI-Stats, Proceedings of Information Theory Symposium (also on Programming Committee).

Refereed Publications¹

(*denotes alphabetical ordering)

1. Matthew Olson, Abraham J. Wyner, Richard Berk . "Generalizations of the Random Forest Kernel", Submitted to KDD, 2017.
2. Matt Olson and Abraham Wyner, Abraham "Modern Neural Networks Generalize Well on Small Data Sets", Submitted to ICML, 2017.
3. Matt Olson and Abraham Wyner, "Do Random Forests Estimate Class Probabilities?" Submitted Journal of Machine Learning Research. 2017
4. Sameer K. Deshpande, Abraham J. Wyner, "[**A hierarchical Bayesian model of pitch framing**](#)", Journal of Quantitative Analysis in Sports, Volume 13, Issue 2, October 2017.
5. Phillip Earnst. Shepp, L. and Abraham Wyner. "Yule's "nonsense correlation" solved!" The Annals of Statistics. Volume 45, Number 4 (2017), 1789-1809

¹ Including articles, discussions and rejoinders in refereed journals and refereed conference proceedings.

6. Abraham J Wyner, Matthew Olson, Justin Bleich, David Mease, [Explaining the Success of AdaBoost and Random Forests as Interpolating Classifiers](#), *Journal of Machine Learning Research* 18 (May, 2017) 1-33.
7. Mathieu E. Wimmer, Justin Rising, Raymond J. Galante, Abraham Wyner, Allan I. Pack, Ted Abel, "Aging in Mice Reduces the Ability to Sustain Sleep/Wake States", *PloS one* 8 (12), e81880, December, 2013.
8. McShane, Blakely B.; Jensen, Shane T.; Pack, Allan I.; Wyner, Abraham J. "Modeling Time Series Dependence for Scoring Sleep in Mice." *Journal of the American Statistical Association*, 108 (504), 1147-1162, 2013.
9. McShane, Blakely B.; Jensen, Shane T.; Pack, Allan I.; Wyner, Abraham J. "Rejoinder: Modeling Time Series Dependence for Scoring Sleep in Mice." *Journal of the American Statistical Association*, 108 (504), 2013.
10. Driver, R. J., Lamb, A. L., Wyner, A. J., & Raizen, D. M. "DAF-16/FOXO Regulates Homeostasis of Essential Sleep-like Behavior during Larval Transitions in *C. elegans*." *Current Biology* (2013).
11. Hu FY, Hanna GM, Han W, Mardini F, Thomas SA, Wyner AJ, Kelz MB, "Hypnotic Hypersensitivity to Volatile Anesthetics and Dexmedetomidine in Dopamine-Hydroxylase Knockout Mice." *Anesthesiology*. Accepted for Publication, November 2012.
12. Hu FY, Hanna GM, Han W, Mardini F, Thomas SA, Wyner AJ, Kelz MB, "Hypnotic Hypersensitivity to Volatile Anesthetics and Dexmedetomidine in Dopamine-Hydroxylase Knockout Mice." *Anesthesiology*. Accepted for Publication, November 2012.
13. *Rising, Justin and Wyner, Abraham. "Partial Kelly Portfolios and Shrinkage Estimators." *IEEE International Symposium on Information Theory Proceedings*, July 2012.
14. Naidoo, N., Ferber M., Galante, R.J., McShane, B.B., Hu, J.H., Zimmerman, J., Maislin, G., Cater, J., Wyner, A. J., Worley, P., and Pack, A.I., "Role of Homer Proteins in the Maintenance of Sleep-Wake States." *PLoS ONE Genetics*, 2012, 7(4): e35174, 2012.

15. McShane, BB; Galante, RJ; Biber, M; Jensen, ST; Wyner, AJ; Pack, AI. "Assessing REM Sleep in Mice Using Video Data." *SLEEP*; 35(3):433-442, 2012.
16. Pick, Jeremy; Chen, Yihan; Moore, Jason T; Sun, Yi; Wyner, Abraham J.; Friedman, Eliot B; Kelz, Max B. "Rapid Eye Movement Sleep Debt Accrues in Mice Exposed to Volatile Anesthetics." *Anesthesiology*: Volume 115 - Issue 4 - p 702–712, 2011.
7. *McShane, B.B. and Wyner, A.J. "Rejoinder: A Statistical Analysis of Multiple Temperature Proxies: Are Reconstructions of Surface Temperatures over the Last 1000 Years Reliable?" *The Annals of Applied Statistics*, Vol. 5, No. 1, 99–123, 2011.
8. *McShane, B.B. and Wyner, A.J. "A Statistical Analysis of Multiple Temperature Proxies: Are Reconstructions of Surface Temperatures over the Last 1000 Years Reliable?" *The Annals of Applied Statistics*, Vol. 5, No. 1, 5–44, 2011.
9. Blakeley B. McShane, Raymond J. Galante, Shane T. Jensen, Nirinjini Naidoo, Allan I. Pack*, and Abraham Wyner* (*Co-Senior authors), "Characterization of the Bout Durations of Sleep and Wakefulness." *Journal of Neuroscience Methods* 193, 321–333, 2010.
10. *Jensen, S.T., McShane, B.B and Wyner, A.J. "Rejoinder: Hierarchical Bayesian modeling of hitting performance in baseball." *Bayesian Analysis*, pp. 669–674, 2009.
11. *Jensen, S.T., McShane, B.B., and Wyner, A.J. "Hierarchical Bayesian modeling of hitting performance in baseball." *Bayesian Analysis* 4, pp. 631–652, 2009.
12. *Jensen, S.T, Shirley, K.E., and Wyner, A.J. "Bayesball: A Bayesian Hierarchical Model for Evaluating Fielding in Major League Baseball." *The Annals of Applied Statistics*, Vol. 3, No. 2, 491–520, 2009.
13. *Bradlow, E., Jensen, S., Wolfers, J. and Wyner, A. "A Statistical Look at Roger Clemens' Pitching Career." *Chance*, Vol. 21, No. 3, 24–30, 2008.
14. *D. Mease, A. Wyner. "Evidence Contrary to the Statistical View of Boosting." *Journal of Machine Learning Research*, 9 131-156, 2008.
15. *D. Mease, A. Wyner. "Evidence Contrary to the Statistical View of Boosting: A Rejoinder to Responses." *Journal of Machine Learning Research*, 9 195-201, 2008.

16. Mease, D., Wyner, A.J. and Buja, A., "Boosted Classification Trees and Class Probability/Quantile Estimation." *Journal of Machine Learning Research*, 8 (Mar): 409--439, 2007.
17. *Buja, A., Mease, D. and Wyner, A.J. "Comment: Boosting Algorithms: Regularization, Prediction and Model Fitting." *Statistical Science*, Vol.22, No. 4, 506-512, 2007.
18. *Belentepe, C., Wyner, A.J. "A Statistical View of Universal Stock Market Portfolios." *Proceedings of the 2005 International Symposium on Information Theory*, Adelaide, Australia, September, 2005.
19. *Ferrari, F. and Wyner, A.J., "Estimation of General Stationary Processes by Variable Length Markov Chains." *Scandinavian Journal of Statistics*, Vol. 30, pp. 459-480, September, 2003.
20. Wyner A.J., "On Boosting and the Exponential Loss." in C. M. Bishop and B. J. Frey (eds), *Proceedings of the Ninth International Workshop on Artificial Intelligence and Statistics*, Jan 3-6, Key West, FL. 2003.
21. *Foster, D., Stine, B. and Wyner, A.J., "Universal Codes for Finite Sequences of Integers Drawn from a Monotone Distribution." *IEEE Transactions on Information Theory*, Volume: 48 Issue: 6, pp. 1713 -1720, June 2002.
22. *Krieger, A., Long, C., and Wyner, A.J., "Boosting Noisy Data." C. Brodley, A. P. Danyluk (Eds.): *Proceedings of the Eighteenth International Conference on Machine Learning*, Williams College, Williamstown, MA, USA, June 28 - July 1, 2001. Morgan Kaufmann, pp. 274-281, 2001.
23. *Friedman, N., Goldszmidt, M., and Wyner, A.J., "Data Analysis with Bayesian Networks: A Bootstrap Approach." *Proceeding of the Fifteenth Conference on Uncertainty in Artificial Intelligence*, pp. 196-205. Morgan Kaufmann, San Francisco, 1999.
24. *Friedman, N., Goldszmidt, M. and Wyner, A.J., "On the Application of the Bootstrap for Computing Confidence Measures on Features of Induced Bayesian Networks." *Artificial Intelligence and Statistics: Proceeding of the Seventh International Workshop on Intelligence and Statistics*, pp. 197-202. Morgan Kaufmann, San Francisco, 1999.

25. Wyner, A.J., "More on Recurrence and Waiting Times." *The Annals of Applied Probability*, Vol. 9, No. 3, pp. 780-796, 1999.
26. *Buhlmann, P. and Wyner, A.J., "Variable Length Markov Chains." *The Annals of Statistics*, Vol. 27, No. 2, pp. 480-513, 1999.
27. Wyner, A.D., Ziv, J. and Wyner, A.J., "On the Role of Pattern Matching in Information Theory." *IEEE Transactions on Information Theory*, Vol. 44, no. 6, pp. 2045-2056, October, 1998.
28. Kontoyiannis, I., Algoet, P.H., Suhov, M. and Wyner, A.J., "Nonparametric Entropy Estimation for Stationary Processes and Random Fields, with Applications to English Text." *IEEE Transactions Information Theory*. Vol. IT-44, pp. 1319 - 1327, May, 1998.
29. Wyner, A.J., "The Redundancy and Distribution of the Phrase Lengths of the Fixed-Database Lempel-Ziv Algorithm." *IEEE Transactions of Information Theory*, Vol. IT-43, pp. 1452 - 1464, September 1997.
30. *Wyner, A.D., and Wyner, A.J., "Improved Redundancy of a Version of the Lempel-Ziv-Algorithm." *IEEE Transactions on Information Theory*, Vol. IT-41, pp. 723 - 731, May, 1995.
31. *Farach, M., Noordewier, N., Sevari, S., Shepp, L., Wyner, A.J., and Ziv, J., "On the Entropy of DNA: Algorithms and Measurements based on Memory and Rapid Convergence." *Proc AC-SIAM, Symposium on Discrete Algorithms (SODA)}*, Philadelphia, PA, pp. 48-57. 1995.
32. *Plotkin, N. and Wyner, A.J., "An Entropy Estimator Algorithm and Telecommunications Applications." G.R. Heidbreder (ed.), *Maximum Entropy and Bayesian Methods*, 351-363. Kluwer Academic Publishers. Santa Barbara, CA, 1993. The Netherlands, 1996.
33. Wyner, A.J. and Foster, D., "On the Lower Limits of Entropy Estimation." *Entropy*, Re-Submitted October 2013.

Non-Refereed Publications

(*denotes alphabetical ordering)

34. Wyner, Abraham. "A Statistician Reads the Sports Pages: Can the Skill Level of a Game of Chance Be Measured?" Shane Jensen (column editor) *Chance*, Vol. 25.3, 2012.
35. *Bradlow, E., Jensen, S., Wolfers, J. and Wyner, A. "Keeping Score: Report Backing Clemens Chooses Its Facts Carefully." *New York Times*, February. 10, 2008.
36. Wyner, Abraham. "Why Do Women's Salaries Still Lag Behind? The Forward, December 20, 2013.

Book Chapters

37. Wyner, A.D., J. Ziv and Wyner, A.J., "On the Role of Pattern Matching in Information Theory." *Information Theory: Fifty Years of Discovery*, S. Verdu and S. McLaughlin, editors. IEEE Press, Piscataway, NJ. 2000.
 - Originally appeared in [27].

Working Papers and Book Projects

38. Wei Han, Max Kelz and Abraham Wyner. "Continuous Segmental Best Fit Analysis using Approximate Entropy."
39. "Learning Data Science through Sports." Advanced undergraduate textbook in statistics and sports analytics.
40. Abraham Wyner and Mark Klinger: "Does the NFL need a High School Draft?" (working paper).

Grants and Contracts

1. **ESPN Baseball Project:** Received a \$ 50K grant from ESPN to study baseball. This grant will fund a large collaboration with several statisticians in our department (Shane Jensen, Dylan Small), graduate students and professors from outside the department.
2. **Mechanisms of Alterations in Sleep with Age.** Multi-million dollar program project grant

will be funded by National Institute on Aging. It will provide 5 years of summer support for a collaboration with the Sleep Center at the University of Pennsylvania. Approved June, 2006.

3. **NIH PhD Training Grant:** This grant will provide full time support for a statistics PhD student beginning from Fall 2007 through 2014.
4. **SBIR Grant to NIH “High Throughput Phenotyping of Mouse using Video”.** This grant proposal submitted in January and approved for funding in March will provide 40K of funding to develop a collaboration with small business partner NeuroCare to explore the commercialization our newly developed technology.
5. **Mechanisms of Alterations in Sleep with Age (renewal).** Multimillion program project grant. Approved Feb, 2013.
6. **Patent Proposal:** we are in the process of patenting this technology.
7. **CURF:** Center for Undergraduate Research. Funding for undergraduate students to pursue summer research.

Doctoral Students: Thesis Advisees

1. Chuan Long, Ph.D. Statistics, 2001.
2. Cengiz Belentepe, Ph.D. Statistics, 2005.
3. Blakeley McShane, Ph.D. Statistics, 2010.
4. Justin Rising, PhD. Candidate Department of Statistics, 2013
5. Wei Han, PhD , Department of Applied Mathematics, 2013 (co-advisor with Alexander Rakhlin).
6. Joshua Magarick, PhD. Department of Statistics, 2015
7. Justin Bleich, PhD. Department of Statistics, 2015
8. Matt Olson, PhD Candidate Department of Statistics, 2018

Wharton Service

- Director of the Undergraduate Program in Statistics (2005-present).
- MBA Faculty cohort Advisor (2003-2007).
- Member of Executive Committee (2003-2004).
- Faculty advisor to Wharton Gaming Club (2002-2003).
- Faculty Advisor to Statistics Society (2013-present)
- Sirius XM “Wharton Moneyball” co-host.

Invited Presentations

Presented technical talks at conferences and universities around the world, including:

Universities:

Stanford University, University of California Berkeley, University of Southern California, University of Chicago, Yale University, Columbia University (Statistics), Rutgers University, Hebrew University (CS), Carnegie-Mellon, Weizmann Institute, Tel Aviv University, ETH-Zurich. Technion, Israel, Ben Gurion University, Israel, University of Massachusetts, Amherst.

Conferences:

Workshop on Information Theory and Applications, International Conference on Complexity, DIMACS, International conference on Neural Information and Processing Systems Workshop, IEEE International Workshop of Information Theory, International Conference on Mathematics and Information Theory, Conference on Information Science and Systems, International Symposium on Information Theory, Mid-West Statistical Society Conference, Harvard University Statistical Research Conference, Joint Statistical Meetings, Wharton Sports Business Initiative Conference.

Teaching Experience

- **Undergraduate:** Intro. Statistics, Introduction to Statistics for Social Scientists and Economics Majors, Introduction to Statistics to Wharton students, Probability Theory.
- **Undergraduate Preceptorial:** Gambling and Probability (2001-2003).
- **Graduate:** Stochastic Processes with Applications (for OR Ph.D. students), Probability (statistics Ph.D. students), Stochastic Processes (for Ph.D. students), Seminar in Advanced Topics in Statistics and Information Theory. Statistics and the Law.
- **MBA:** Statistics for Managers (core courses: Stat 611, 612, 603, 621).
- **MBA Independent Study:** Vik Kakkar, Jackie Pangilinan, Brooks Powlen, Clint Siegfried, Timothy Skender (Sports Research), Brendan Harris.
- **High School:** Wharton Moneyball Academy. Summer program for gifted high school students.
- **Undergraduate Independent Study and Research** (since 2005):
 1. Andrew Yang
 2. Dan Short
 3. Matt Kozim,
 4. Matt Corruth,
 5. Elan Fuld
 6. Charlie Boatwright
 7. Julie Kandel-Krieger

8. Sam Mondry-Cohen
9. Michael Olivares
10. Sydney Scott
11. Divya Krishnan
12. Danish Munir
13. Tamara Pier
14. Jake Lechnir
15. Alex Frenzel
16. Samuel Zhang
17. Eric Babitz
18. Sam Bauman
19. Aaya Elzarka
20. Robert Naruse
21. Marc Klinger
22. Andrew Castle