

CURRICULUM VITAE

for
Pieter C. Allaart

Career:

- Associate Professor, University of North Texas, 2007-present
- Assistant Professor, University of North Texas, 2001-2007
- Visiting Assistant Professor, University of North Texas, 1998-2001

Honors:

- GCOE Foreign Researcher, Kyoto University, September-November 2009

Education:

- Ph.D., Mathematics (1998), Free University Amsterdam.
Thesis advisors: Prof. P.J. Holewijn (Free University) and Prof. T.P. Hill (Georgia Institute of Technology).
Ph.D. thesis: *Ranges of vector measures and optimal-partitioning inequalities.*
- M.A., Mathematics, Free University, 1994.
Master's thesis: *A constant-sum characterization of Benford's Law.*

Teaching experience:

- *Undergraduate:* Calculus I, II and III, Discrete Mathematics, Differential Equations, Probability, Statistics, Applied Statistics, Real Analysis, Numerical Analysis, Linear Algebra, Precalculus, College Algebra.
- *Graduate:* Introduction to Analysis, Markov Processes, Real Analysis, Probability, and various reading courses and special topics courses in Stochastic Processes, Mathematical Finance, and Fractal Geometry.

Advising:

- Huzefa Kagalwala, M.S. 2008.
- Benjamin Schaighofer, M.S. 2014.
- Joseph Czop, M.S. 2015.
- José Islas, Ph.D. 2015.
- Ed Brophy (PhD) (expected completion date: December 2017)
- Andrew Allen (PhD) (expected completion date: May 2018)

Research interests:

Optimal stopping, Probability inequalities, Benford's Law, Fractal geometry, Non-differentiable functions, Beta expansions.

List of publications:

1. An invariant-sum characterization of Benford's law.
J. Appl. Probab. 34, 288-291 (1997).
2. Minimax risk inequalities for the location-parameter classification problem.
J. Multivariate Anal. 66, no.2, 255-269 (1998).
3. Bounds on the non-convexity of ranges of vector measures with atoms.
Contemp. Math. 234, 1-11 (1999).
4. A sharp non-convexity bound for partition ranges of vector measures with atoms.
J. Math. Anal. Appl. 235, 326-348 (1999).
5. Inequalities relating maximal moments to other measures of dispersion.
Statistica Neerlandica 54, no.3, 366-373 (2000).
6. (with M. Monticino) Optimal stopping rules for directionally reinforced processes.
Adv. Appl. Probab. 33, 483-504 (2001).
7. Moments of the mean of Dubins-Freedman random probability distributions.
J. Theoret. Prob. 16, no. 2, 471-488 (2003).
8. (with M. Monticino) Pseudo-prophet inequalities in average-optimal stopping.
Sequential Anal. 22, no. 3, 233-239 (2003).
9. Optimal stopping rules for correlated random walks with a discount.
J. Appl. Probab. 41, no. 2, 483-496 (2004).
10. An application of prophet regions to optimal stopping with a random number of observations.
Optimization 53, no. 4, 331-338 (2004).
11. Stopping the maximum of a correlated random walk, with cost for observation.
J. Appl. Probab. 41, no. 4, 998-1007 (2004).
12. Prophet regions for independent $[0, 1]$ -valued random variables with random discounting.
Stoch. Anal. Appl. 23, no. 3, 491-509 (2005).
13. (with K. Kawamura) Extreme values of some continuous, nowhere differentiable functions.
Math. Proc. Camb. Phil. Soc. 140, no. 2, 269-295 (2006).

14. (with K. Kawamura) On the coordinate functions of Lévy's dragon curve. *Real Anal. Exchange* 31, no. 1, 295-308 (2005/06).
15. Prophet regions for discounted, uniformly bounded random variables. *Stoch. Anal. Appl.* 24, no. 3, 531-554 (2006).
16. (with K. Kawamura) Dimensions of the coordinate functions of space-filling curves. *J. Math. Anal. Appl.* 335, 1161-1176 (2007).
17. Prophet inequalities for i.i.d. random variables with random arrival times. *Sequential Anal.* 26, no. 4, 403-413 (2007).
18. (with M. Monticino) Optimal buy/sell strategies for directionally reinforced processes. *J. Appl. Probab.* 45, 33-44 (2008).
19. Distribution of the maxima of random Takagi functions. *Acta Math. Hungarica* 121, no. 3, 243-275 (2008).
20. On a flexible class of continuous functions with uniform local structure. *J. Math. Soc. Japan* 61, no. 1, 237-262 (2009).
21. (with R. D. Mauldin) Injectivity of the Dubins-Freedman construction of random distributions. *Contemp. Math.* 485, 1-6 (2009).
22. A sharp ratio inequality for optimal stopping when only relative record times are observed. *Sequential Anal.* 28, no. 4, 455-458 (2009).
23. (with K. Kawamura) The improper infinite derivatives of Takagi's nowhere differentiable continuous function. *J. Math. Anal. Appl.* 372, 656-665 (2010).
24. Optimal stopping rules for American and Russian options in a correlated random walk model. *Stoch. Models* 26, no. 4, 594-616 (2010).
25. A general "bang-bang" principle for predicting the maximum of a random walk. *J. Appl. Probab.* 47, no. 4, 1072-1083 (2010).
26. An inequality for sums of binary digits, with application to Takagi functions. *J. Math. Anal. Appl.* 381, no. 2, 689-694 (2011)
27. Predicting the maximum: optimality of "stop at once or not at all". *J. Appl. Probab.* 49, no. 3, 806-820 (2012)
28. How large are the level sets of the Takagi function? *Monatsh. Math.* 167, 311-331 (2012)
29. On the finite cardinalities of level sets of the Takagi function. *J. Math. Anal. Appl.* 388, 1117-1129 (2012)

30. (with K. Kawamura) The Takagi function: a survey. *Real Anal. Exchange* 37, no. 1, 1-54 (2011/12)
31. Level sets of signed Takagi functions. *Acta Math. Hungarica* 141, no. 4, 339-352 (2013)
32. Digital sum inequalities and approximate convexity of Takagi-type functions. *Math. Ineq. Appl.* 17, no. 2, 679-691 (2014)
33. On the level sets of the Takagi-van der Waerden functions. *J. Math. Anal. Appl.* 419, 1168-1180 (2014)
34. Correction and strengthening of “How large are the level sets of the Takagi function?”, *Monatsh. Math.* 175, no. 2, 313-318 (2014)
35. Hausdorff dimension of level sets of generalized Takagi functions. *Math. Proc. Camb. Phil. Soc.* 157, 253-278 (2014)
36. The infinite derivatives of Okamoto’s function: an application of β -expansions. *J. Fractal Geom.* 3, no. 1, 1–31 (2016)
37. (with J. Islas) A sharp lower bound for choosing the maximum of an independent sequence. To appear in *J. Applied Probab.*

Invited research talks:

- *The first digit problem.*
Probability Seminar, Georgia Institute of Technology, Atlanta. (April 1995)
- *Two sharp inequalities related to measure-partitioning in statistics and fair division theory.* AMS meeting, Special Session on Stochastic Inequalities, Atlanta. (October 1997)
- *Maximal moments as a measure of dispersion.*
Joint AMS/SMM meeting, Session on Stochastic Processes, Denton. (May 1999)
- *A generalization of Lyapounov’s convexity theorem to measures with atoms.*
Joint AMS/SMM meeting, Session on Functional Analysis, Denton. (May 1999)
- *Some old and some new maximal moment inequalities.* Symposium in honor of the retirement of Professor P. Holewijn, Amsterdam. (September 1999)
- *Random probability distributions and average-optimal stopping.* University of North Texas. (March 2001)
- *Inequalities for optimal stopping with unequal information.* Probability Seminar, **Columbia University**. (February 2007)

- *Optimal exercise times for American and Russian options under a correlated random walk model.* Aichi University, Nagoya. (June 2009)
- *Optimal prediction of the maximum of a stochastic process.* Probability and Mathematical Finance seminar, University of Texas, Austin. (November 2011)
- *A new look at the Takagi function.* Kyoto University Mathematics Department Colloquium, Kyoto. (May 2012)
- *The Hausdorff dimension of level sets of generalized Takagi functions.* AMS Southeastern Sectional Meeting, Oxford, MS. (March 2013)
- *Zero sets and maximum sets of randomized Takagi functions.* AMS Meeting, Lubbock, TX. (April 2014)
- *The infinite derivatives of Okamoto's function and β -expansions.* Kyoto University Dynamical Systems Seminar, Kyoto, Japan. (May 2015)
- *The infinite derivatives of Okamoto's function and β -expansions.* AMS Southeastern Sectional Meeting, Memphis, TN. (October 2015)

Other research talks (selection):

- *Lyapounov's convexity theorem and the classification problem.* Graduate Student Probability Seminar, Georgia Tech, Atlanta. (February 1996)
- *Cake cutting, Lévy concentration and the location-parameter classification problem.* Tenth European Young Statisticians Meeting, Warsaw. (August 1997)
- *Optimal stopping rules for directionally reinforced processes.* AMS Session on Prob. and Stat., Joint Meetings, New Orleans. (January 2001)
- *Optimal stopping rules for correlated random walks with a discount* AMS Session on Prob. and Stat., Joint Meetings, San Diego. (January 2002)
- *Stopping the maximum of a correlated random walk, with application to Russian options.* Sixth World Conference of the Bernoulli Society, Barcelona, Spain. (July 2004)
- *The coordinate functions of Lévy dragon curve.* Real Analysis Symposium, Walla Walla. (June 2005)
- *Prophet regions for uniformly bounded random variables with random discounting.* 30th Conference on Stochastic Processes and their Applications, Santa Barbara. (June 2005)

- *Prophet inequalities for i.i.d. random variables with random arrival times.* 31st Conference on Stochastic Processes and their Applications, Paris. (July 2006)
- *Dimension estimates for the coordinate functions of Pólya's space-filling curve.* Conference on Mathematics on Fractals, Kyoto, Japan. (September 2006)
- *Prophet inequalities for i.i.d. random variables with random arrival times.* Conference in honor of Professor E. Samuel-Cahn, Jerusalem, Israel. (December 2006)
- *Injectivity of the Dubins-Freedman construction of random distributions.* Ergodic Theory Workshop, Chapel Hill. (February 2008)
- *Injectivity of the Dubins-Freedman construction of random distributions, a follow-up.* Real Analysis Symposium, Chicago. (June 2008)
- *Injectivity of the Dubins-Freedman construction of random distributions.* Kyoto University Probability Seminar. (April 2009)
- *On generalized Takagi functions.* RIMS, Kyoto University. (May 2009)
- *Maximum and minimum values of some continuous nowhere-differentiable functions.* Dynamical Systems Seminar, Kyoto University (joint with K. Kawamura). (July 2009)
- *General secretary-type problems for random walk.* RIMS Conference: "Decision Making Processes under Uncertainty and Ambiguity", Kyoto (**in Japanese**). (November 2009)
- *The improper infinite derivatives of the Takagi function.* Real Analysis Symposium, Wooster, Ohio. (July 2010)
- *On the level sets of the Takagi function.* Real Analysis Symposium, Budapest, Hungary (June 2011)
- *Optimal prediction of the maximum of a stochastic process.* XVIII SIMMAC (International Symposium on Mathematical Methods Applied to the Sciences), San José, Costa Rica. (February 2012)
- *The Hausdorff dimension of level sets of generalized Takagi functions.* RTG Conference on logic, dynamics and their interactions, with a celebration of the work of Dan Mauldin, Denton. (June 2012)
- *Zero sets and maximum sets of randomized Takagi functions.* Real Analysis Symposium, Prague. (July 2014)

Grants awarded:

- UNT Junior Faculty Summer Research Fellowship Grant (2002), \$5000
- UNT Faculty Research Grant no. 34393 (2002), \$3500

External grants applied for:

- NSF Probability Program (2003, 2004 and 2005)
- NSF Analysis Program (2007)

Other scholarly activities:

- Coordinator of UNT Stochastics Seminar (2001-2005); joint coordinator (with S. Betelu) of UNT Applied Math Seminar (2005).
- Referee for:
 - Annals of Probability
 - Journal of Applied Probability (3)
 - Journal of Applied Mathematics (2)
 - Annals of the Institute of Statistical Mathematics
 - Annals of Applied Probability
 - American Mathematical Monthly
 - Sequential Analysis (2)
 - Publicationes Mathematicae Debrecen
 - European Journal of Operations Research
 - Journal of Fourier Analysis and Applications
 - Mediterranean Journal of Mathematics (2009)
 - Publications of RIMS (2009)
 - Proceedings of the Japan Academy, Ser. A (2009)
 - Journal of Probability and Statistics (2010)
 - Abhandlungen aus dem Seminarium der Universität Hamburg (2010)
 - Monatshefte für Mathematik (2010)
 - Taiwanese Journal of Mathematics (2010)
 - Advances in Decision Sciences (2011)
 - Stochastics (2011)
 - Journal of Nonlinear Analysis, Ser. A (2011)
 - Colloquium Mathematicum (2011)
 - Nonlinearity (2011)
 - Journal of Mathematical Analysis and Applications (2011)
 - Comptes Rendus Mathématiques (2011)
 - Real Analysis Exchange (2012)
 - Statistics and Probability Letters (2012)
 - Transactions of the American Mathematical Society (2012)
 - Mathematica Slovaca (2012)
 - Journal of Applied Probability (2012)
 - Monatshefte für Mathematik (2012)

- Journal of Mathematics (2013)
 - Proceedings of the AMS (2013)
 - The American Statistician (2013)
 - Mathematical Social Sciences (2013)
 - Positivity (2014)
 - Journal of Mathematical Analysis and Applications (2015) (2 papers)
 - Mediterranean Journal of Mathematics (2015)
- Reviewer for Mathematical Reviews (since June 2005).
 - Reviewer of a grant proposal to the Israel Science Foundation (February 2007).

Service:

- Mathematics Department Undergraduate Affairs Committee (2002-2008, 2010/11)
- College of Arts and Sciences Undergraduate Curriculum Committee (2006-2009)
- Chair of Harmonic Analysis and Differential Equations Search Committee (2007/08)
- Mathematics Department Executive Committee (2010-2012)
- Chair of Mathematics Department Graduate Affairs Committee (2011-2013)
- Mathematics Department Strategic Planning Committee (2013-2017)