

Curriculum Vitae for Torben Tvedebrink

Personal information

Full name Torben Tvedebrink
Position Assistant Professor, PhD
Date of birth 22nd of September 1981
Citizenship Danish
Marital status Married to Tenna D. O. Tvedebrink (Sep 2009)
Children Marius D. Tvedebrink (Mar 2011)
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Research interest

My primary field of interest is statistical modelling of challenges arising in forensic genetics. Forensic genetics is about drawing conclusions from biological evidence related to various types of crimes and legal disputes. Modern forensic genetics rely on various biotechnological techniques (PCR, electrophoresis, sequencing etc.), which are susceptible and sensible to the conditions of the biological material under analysis, e.g. found at a scene of crime. Furthermore, population genetics and risk analysis play an important role in the evaluation of the weight of evidence, which is crucial in the communication with the judicatory system.

Educational information

- Adjunkt pædagogikum, Aalborg University (2014).
- PhD in Statistics, Aalborg University (2010).
- MSc (cand.scient) in Mathematics and Statistics, Aalborg University (2007).
- MSc (with distinction) in Applied Statistics, University of Oxford (2006).
- BSc in Mathematics, Aalborg University (2005).

Academic positions held

- Assistant Professor, Department of Mathematical Sciences, Aalborg University (2013 – present).
- Postdoc at Department of Mathematical Sciences, Aalborg University (2010 – 2012).
- Teacher at the Copenhagen Forensic Genetic Summer School (2009, 2011).
- PhD student at Department of Mathematical Sciences, Aalborg University (2007 – 2010).
- Biostatistician and consultant at Aalborg Hospital (2006 – 2007).

Teaching experience

I have taught several introductory probability and statistics courses in various engineering programmes at Aalborg University. I have developed and executed the graduate course in data mining taught at the Department of Mathematical Sciences, AAU.

I have supervised project groups in the mathematical programmes ranging from first year students to Master students in statistics (supervised three master students in 2015 with grades of 10 and 12 as outcome).

Organisational experience

I was the main organiser and chair of the local organising committee of useR! 2015 in Aalborg, 1 – 3 July, 2015. I was responsible for negotiating with venue, caterers, speakers and tutorial organisers. We had more than 660 international participants from more than 40 countries for the conference, which most participants voted their best conference experience.

I serve on the departmental council of the Department of Mathematical Sciences, Aalborg University.

I have had a key role in the curriculum commission revising the study programmes in mathematics and math-econ at Aalborg University.

Visiting positions

- Isaac Newton Institute, Cambridge (2016: Autumn semester)
- Department of Statistics, Univ. of Auckland, New Zealand (2010: Jan and Nov; 2013: Sep).
- Department of Biostatistics, Univ. of Washington, Seattle, USA (2008: Autumn).

Scientific awards

The Spar Nord Foundation's Research Prize, 2011 (250,000 DKK).

Won "Best Poster"-award at the International Conference of Forensic Inference and Statistics, 2008.

Grants and external funding

Externally funded postdoc and assistant professorship positions (2010 – 2016) with 2/3 of expenses paid by the Section of Forensic Genetics, Department of Forensic Medicine, Faculty of Health and Medical Sciences, University of Copenhagen.

Externally funded PhD position (2007 – 2010) with 1/2 of expenses paid by the Section of Forensic Genetics, Department of Forensic Medicine, Faculty of Health and Medical Sciences, University of Copenhagen.

Ellen og Aage Andersen's Fonden (2010: 15,000 DKK), Oticon Fondet (2009: 2,500 DKK), Forskerskolen AAU (2008: 14,000 DKK), Oticon Fondet (2008: 10,000 DKK), Christian og Otilia Brorsons Rejselegat (2008: 15,000 DKK), Knud Højgaard's Fond (2008: 15,000 DKK).

Aon price (2006: 1,000£) and Jesus College (2006: 1,200£), Methe Lundiges Uddannelsesfond (2006: 27,000 DKK), F-Studienævnet AAU (2005: 4,000 DKK), Aalborg Bankens legat (2005: 5,000 DKK) Internationaliseringspøjle AAU (2005: 10,000 DKK), Den Midtjyske Bladfond (2005: 10,000 DKK), Oticon Fondet (2005: 12,000 DKK) and Nordea Fonden (2005: 20,000 DKK).

Number of scientific peer-reviewed publications

Total number of peer-reviewed publications 2008 - 2012: 24 (see enclosed list of publications), with a total of 174 Web of Science citations (WoS *h*-index: 7, Google *h*-index: 9).

Seminars and conference contributions

Presentation at Isaac Newton Institute, Cambridge, 7 – 11 Nov, 2016.

Seminar at Department of Mathematics, Aarhus University, Autumn 2015.

Main organiser and chair of the local organising committee of useR! in Aalborg, July 1 – 3, 2015.

9th International Conference on Forensic Inference and Statistics 2014, Leiden (19 - 22 Aug 2014)

Talk: The Effect of *R*-Allele and Wild Card Designations in Forensic DNA Database Searches

Poster: Exact calculation of the distribution of the number of alleles in DNA mixtures.

25th International Society of Forensic Genetics Congress 2013, Melbourne (2 - 7 Sep 2013)

Talk: The effect of using wildcards in forensic DNA database searches.

Poster: Estimating drop-out probabilities of STR alleles accounting for truncation and degradation.

Poster: Exact calculation of the distribution of the number of alleles in DNA mixtures.

Seminar during the two-day meeting of the Danish Society of Theoretical Statistics, DTU, 5 - 6 November 2013.

29th European Meeting of Statisticians 2013, Budapest (20 - 25 July 2013)

Organiser and chair of an invited paper session on "Forensic Statistics".

Poster: The use of wildcards in forensic DNA database searches.

Seminar at Aarhus University, Foulum, 22 March 2013.

The annual seminar for criminal law professors and teachers, Aalborg (23 - 25 Aug 2012)

Talk on forensic genetics and DNA as evidence in court.

24th International Society of Forensic Genetics Congress 2011, Vienna (29 Aug - 3 Sep 2011)

Talk: Statistical model for degraded DNA samples and adjusted probabilities for allelic drop-out.

Poster: mixsep - An R-package for DNA mixture separation.

23rd International Society of Forensic Genetics Congress 2009, Buenos Aires (15 - 18 Aug 2009)

Talk: Overdispersion in allelic counts and θ -correction in forensic genetics.

7th International Conference on Forensic Inference and Statistics 2008, Lausanne (20 - 23 Aug 2008)

Talk: Finding the best matching pair of profiles in 2-person DNA mixtures and evaluation of the LR .

Poster: Stochastic filtering of quantitative data from STR DNA analysis.

22nd International Society of Forensic Genetics Congress 2007, Copenhagen (22 - 25 Aug 2007)

Talk: Amplification of DNA mixtures - missing data approach.

Scientific collaborators

Niels Morling (Prof.), Department of Forensic Medicine, University of Copenhagen.

James M. Curran (Prof.), Department of Statistics, University of Auckland, New Zealand.

John S. Buckleton (Principal Scientist), Environmental Research and Science, Auckland, New Zealand.

Bruce S. Weir (Prof.), Department of Biostatistics, University of Washington, Seattle, USA.

David J. Balding (Prof.), Department of Mathematics and Statistics, University of Melbourne, Australia.

Steffen Lauritzen (Prof.), Department of Mathematical Sciences, University of Copenhagen, Denmark.

Other activities

Reviewer for:

Forensic Science International: Genetics. Australian and New Zealand Journal of Statistics. Genetic Research.

Professional memberships:

Departmental Council, Department of Mathematical Sciences, Aalborg University. Danish Society for Theoretical Statistics. International Society for Forensic Genetics.

List of publications

- Tvedebrink T** (2016). “DNA Mixtures”. In: *Forensic Genetics / biodiversity and heredity in civil and criminal investigation*. Ed. by Antonio Amorin and Bruce Budowle. Imperial College Press.
- Tvedebrink T**, JA Bright, JS Buckleton, JM Curran, and N Morling (2015). “The effect of wild card designations and rare alleles in forensic DNA database searches”. In: *Forensic Science International: Genetics* 16, pp. 98–104.
- Tvedebrink T**, PS Eriksen, and N Morling (2015). “The multivariate Dirichlet-multinomial distribution and its application in forensic genetics to adjust for subpopulation effects using the θ -correction”. In: *Theoretical Population Biology*. In Press.
- Tvedebrink T** and N Morling (2015). “Identical twins in forensic genetics - epidemiology and risk based estimation of weight of evidence”. In: *Science & Justice*. (In Press).
- J, Buckleton, H Kelly, JA Bright, D Taylor, **T Tvedebrink**, and JM Curran (2014). “Utilising allelic dropout probabilities estimated by logistic regression in casework”. In: *Forensic Science International: Genetics* 9, pp. 9–11.
- Tvedebrink T** (2014). “On the exact distribution of the numbers of alleles in DNA mixtures”. In: *International Journal of Legal Medicine* 128.3, pp. 427–437.
- CH, Petersen, BB Hjort, **T Tvedebrink**, LJ Kielpinski, J Vinther, and N Morling (2013). “Body fluid identification of blood, saliva and semen using second generation sequencing of micro-RNA”. In: *Forensic Science International: Genetics Supplement Series*.
- JD, Andersen, **T Tvedebrink**, HS Mogensen, C Brsting, and N Morling (2013). “Drop-out probabilities of IrisPlex SNP alleles”. In: *Forensic Science International: Genetics Supplement Series* 4.1, e238–e239.
- Tvedebrink T**, M Asplund, PS Eriksen, HS Mogensen, and N Morling (2013). “Estimating drop-out probabilities of STR alleles accounting for stutters, detection threshold truncation and degradation”. In: *Forensic Science International: Genetics Supplement Series* 4.1, e51–e52.
- Tvedebrink, T**, PS Eriksen, M Asplund, HS Mogensen, and N Morling (2012). “Allelic drop-out probabilities estimated by logistic regression - further considerations and practical implementation”. In: *Forensic Sci Int Genet* 6.2, pp. 263–267.
- Tvedebrink, T**, HS Mogensen MC Stene, and N Morling (2012). “Performance of two 17 locus forensic identification STR kits – Applied Biosystems’s AmpF ℓ STR[®] NGMSelect[™] and Promega’s PowerPlex[®] ESI17 kits”. In: *Forensic Sci Int Genet* 6.5, pp. 523–531.
- Tvedebrink, T**, JM Curran, PS Eriksen, HS Mogensen, and N Morling (2012). “Analysis of matches and partial-matches in a Danish STR data set”. In: *Forensic Sci Int Genet* 6.3, pp. 387–392.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2012a). “Identifying contributors of DNA mixtures by means of quantitative information of STR typing”. In: *J Comput Biol* 19.7, pp. 887–902.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2012b). “Statistical model for degraded DNA samples and adjusted probabilities for allelic drop-out”. In: *Forensic Sci Int Genet* 6.1, pp. 97–101.
- Phillips, C, L Fernandez-Formoso, M Garcia-Magariños, L Porrás, **T Tvedebrink**, et al. (2011). “Analysis of global variability in 15 established and 5 new European Standard Set (ESS) STRs using the CEPH human genome diversity panel”. In: *Forensic Sci Int Genet* 5.3, pp. 155–169.

- Tvedebrink, T** (2011). “mixsep: An R-package for DNA mixture separation”. In: *Forensic Sci Int Genet Supplement Series 3.1*, e486–e488.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2011). “Statistical model for degraded DNA samples and adjusted probabilities for allelic drop-out”. In: *Forensic Sci Int Genet Supplement Series 3.1*, e489–e491.
- Tvedebrink, T** (2010). “Overdispersion in allelic counts and θ -correction in forensic genetics”. In: *Theor Popul Biol* 78.3, pp. 200–210.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2010). “Evaluating the weight of evidence using quantitative STR data in DNA mixtures”. In: *J R Stat Soc Ser C Appl Stat* 59.5, pp. 855–874.
- Wogelius, P, D Haubek, A Nechifor, M Nørgaard, **T Tvedebrink**, and S Poulsen (2010). “Association between use of asthma drugs and prevalence of demarcated opacities in permanent first molars in 6-to-8-year-old Danish children”. In: *Community Dent Oral Epidemiol* 38.2, pp. 145–151.
- Tvedebrink, T** (2009). “Overdispersion in allelic counts and θ -correction in forensic genetics”. In: *Forensic Sci Int Genet Supplement Series 2*, pp. 455–457.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2009 - Terminated). “Computer-Assisted Method of Analyzing a DNA Mixture”. US Patent Application.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2009). “Estimating the probability of allelic drop-out of STR alleles in forensic genetics”. In: *Forensic Sci Int Genet* 3.4, pp. 222–226.
- Tvedebrink, T**, PS Eriksen, HS Mogensen, and N Morling (2008). “Amplification of DNA mixtures - Missing data approach”. In: *Forensic Sci Int Genet Supplement Series 1*, pp. 664–666.
- Tvedebrink, T**, S Lundbye-Christensen, RW Thomsen, C Dethlefsen, and HC Schönheyder (2008). “Seasonal changes in climatic parameters and pneumococcal bacteraemia incidence in Denmark”. In: *Clin Microbiol Infect* 14.12, pp. 1183–1186.