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Jonathan P Williams

PROFESSIONAL POSITIONS

Visiting Fellow, Centre for Adv. Study, Norwegian Academy of Science and Letters	2022 - 2023
Assistant Professor (tenure-track), Department of Statistics, NC State University	2019 -
Research Collaborator, Mayo Clinic, Rochester, MN	2017 - 2020
Biostatistics Intern, Mayo Clinic, Rochester, MN	Summer 2016
Statistical Consultant, Caster Concepts, Inc, Albion, MI	2011 - 2014
Associate Editor, *Journal of the American Statistical Association: Reviews*	2023 -
Associate Editor, *The American Statistician: Reviews*	2023 -

EDUCATION

University of North Carolina, Chapel Hill, NC — 2014 - 2019
Department of Statistics and Operations Research
PhD Statistics
Advisors: Dr. Jan Hannig (UNC) and Dr. Curtis Storlie (Mayo Clinic)

New York University, New York, NY — 2012 - 2014
Courant Institute of Mathematical Sciences
MS Mathematics
Advisor: Dr. Ying Lu

PEER-REVIEWED PAPERS

[†] Graduate student working under my supervision
[⋆] Undergraduate student working under my supervision

Manuscripts appearing in journals with **statistical focus**

23. **J P Williams** (202x). Model-free generalized fiducial inference. *In review.*

22. A Murph[†], C B Storlie, P M Wilson, **J P Williams**, and J Hannig (202x). Bayes Watch: Bayesian Change-point Detection for Process Monitoring with Fault Detection. *In review.*

21. N Dey[†] and **J P Williams** (202x). Valid inference for machine learning model parameters. *In review.*

20. N Dey[†], M Singer[†], **J P Williams**, and S Sengupta (202x). Word Embeddings as Statistical Estimators. *In review.*

19. J Hickey[†], **J P Williams**, and E C Hector (202x). Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). *In review.*

18. E B Kendall[†], **J P Williams**, G H Hermansen, F Bois, and V H Thanh (202x). Beyond time-homogeneity for continuous-time multistate Markov models. *In review.*

17. A Murph[†], J Hannig, and **J P Williams** (202x). Generalized fiducial inference on differentiable manifolds. *In review.*

16. M A Abba[†], **J P Williams**, and B J Reich (202x). A penalized complexity prior for deep Bayesian transfer learning with application to materials informatics. *To appear in Annals of Applied Statistics.*

15. N Dey[†], J Ding[†], J Ferrell[⋆], C Kapper[⋆], M Lovig[⋆], E Planchon[⋆], and **J P Williams** (2023). Conformal prediction for text infilling and part-of-speech prediction. *New England Journal of Statistics in Data Science* 1 pp.69–83.

14. **J P Williams**, G H Hermansen, H M Nygård, G Clayton, S A Rustad, and H Strand (202x). Bayesian hidden Markov models for latent variable labeling assignments in conflict research: application to the role ceasefires play in conflict dynamics. *In review.*

13. S Koner[†] and **J P Williams** (2023). The EAS approach to variable selection for multivariate response data in high-dimensional settings. *Electronic Journal of Statistics* 17 (2) pp.1947–1995.

12. A Murph[†], J Hannig, and **J P Williams** (202x). Introduction to generalized fiducial inference. *To appear in CRC Press BFF Handbook.*

11. **J P Williams**, Y Xie, and J Hannig (2023). The EAS approach for graphical selection consistency in vector autoregression models. *Canadian Journal of Statistics* 51 (2) pp.674–703.

10. **J P Williams**, D M Ommen, and J Hannig (2023). Generalized fiducial factor: an alternative to the Bayes factor for forensic identification of source problems. *Annals of Applied Statistics* 17 (1) pp.378–402.

9. **J P Williams** (2021). Discussion of "A Gibbs sampler for a class of random convex polytopes". *Journal of the American Statistical Association* 116 (535) pp.1198–1200.

8. **J P Williams**, C B Storlie, T M Therneau, C R Jack Jr, and J Hannig (2020). A Bayesian approach to multi-state hidden Markov models: application to dementia progression. *Journal of the American Statistical Association* 115 (529) pp.16–31.

7. **J P Williams** and J Hannig (2019). Non-penalized variable selection in high-dimensional linear model settings via generalized fiducial inference. *Annals of Statistics* 47 (3) pp.1723–1753.

6. I Carmichael and **J P Williams** (2018). An exposition of the false confidence theorem. *Stat* 7 (1) pp.e201.

5. **J P Williams** and Y Lu (2015). Covariance Selection in the Linear Mixed Effect Model, *Journal of Machine Learning Research: Workshop and Conference Proceedings* 44 pp.277–291. (NIPS conference session)

Manuscripts appearing in journals with **non-statistical focus**

4. N Giertych[†], **J P Williams**, and P Haravu[⋆] (202x). A statistical primer on exoplanet detection methods. *In review.*

3. I Carmichael, T Keefe, N Giertych[†], and **J P Williams** (202x). yaglm: a Python package for fitting and tuning generalized linear models that supports structured, adaptive and non-convex penalties. *In progress, but manuscript available on my website.*

2. S Nghiem, **J P Williams**, C Afoakwah, Q Huynh, S K Ng, and J Byrnes (2021). Can administrative health data improve the gold standard? Evidence from a model of the progression of myocardial infarction. *International Journal of Environmental Research and Public Health* 18 (14) pp.7385.

1. E Sechi, E Shosha, **J P Williams**, S J Pittock, B G Weinshenker, B M Keegan, N L Zalewski, A S Lopez-Chiriboga, J Jitprapaikulsan, and E P Flanagan (2019). Aquaporin-4 and MOG autoantibody discovery in idiopathic transverse myelitis epidemiology. *Neurology* 93 (4) pp.e414–e420.

FUNDING

5. Statistical foundations for uncertainty quantification of machine intelligence assembled from generalized fiducial inference (2023-2024). NC State Faculty Research and Professional Development Fund, sole-PI, 7,000 USD.

4. Seed grant: Hidden Markov methodology for assessing racial stressors (2023-2024). NC State Data Science Academy, PI, 50,000 USD.

3. R56: Hidden Markov methodology for machine learning applied to identifying physiological states of shock in the intensive care unit via biomedical and unstructured text data (2021-2022). NIH R56HL155373, sole-PI, 494,527 USD.

2. REU Site: Directed Research for Undergraduates in Math and Statistics (DRUMS) (2021-2024). NSF 2051010, Faculty Associate, 488,397 USD.

1. REU Site: Directed Research for Undergraduates in Math and Statistics (DRUMS) (2021). NSA H98230-21-1-0014, Faculty Associate, 125,000 USD.

PROFESSIONAL SERVICES

- Reviewer for *National Science Foundation* — 1 proposal
- Referee for *Journal of the American Statistical Association: Theory and Methods* — 2 manuscripts
- Referee for *Sankhya A* — 1 manuscript
- Referee for *Statistics in Medicine* — 1 manuscript
- Referee for *Biometrics* — 2 manuscripts
- Referee for *Journal of Computational and Graphical Statistics* — 3 manuscripts
- Referee for *International Journal of Approximate Reasoning* — 1 manuscript
- Referee for *Journal of Statistical Planning and Inference* — 1 manuscript
- Referee for *Statistical Methods in Medical Research* — 2 manuscripts
- Referee for *Stat* — 6 manuscripts
- Referee for *The New England Journal of Statistics in Data Science* — 1 manuscript
- Referee for *SCIENCE CHINA Mathematics* — 2 manuscripts
- Referee for *CRC Press* — 1 manuscript
- Referee for *Communications in Statistics: Theory and Methods* — 1 manuscript
- Referee for *PLOS ONE* — 1 manuscript
- Referee for *Statistical Modelling* — 1 manuscript
- Referee for *Negotiation Journal* — 1 manuscript
- Referee for *Computers* — 1 manuscript
- Referee for *Mathematics* — 1 manuscript
- Referee for *Stats* — 1 manuscript

PRESENTATIONS

26. Discussion of "Imprecise probability in statistics: why imprecision is needed, where it comes from, and how it's beneficial". *Seminar*, Department of Statistics, North Carolina State University, October 2023.

25. Organizer/discussant: topic-contributed session "Modeling techniques for astrostatistical datasets". *Joint Statistical Meeting*, Toronto, Canada, August 2023.

24. Model-free generalized fiducial inference. *Eighth Bayesian, Fiducial, and Frequentist Conference*, University of Cincinnati, May 2023.

23. Model-free generalized fiducial inference. *Seminar Series in Statistics and Data Science.* Department of Mathematics, University of Oslo, Norway, December 2022.

22. Introduction to conformal-based uncertainty quantification and applications to automated valuation models. *CAS Workshop: Prediction with Uncertainty*, Oslo, Norway, December 2022.

21. Tutorial on conformal prediction, and a new idea. *Seminar*, Norwegian Computing Center, Oslo, Norway, December 2022.

20. Hidden Markov model applications for conflict data. *CAS Workshop: From Processes to Models*, Oslo, Norway, October 2022.

19. Conformal predictors constructed from generalized fiducial inference. *Joint Statistical Meeting*, Washington, DC, August 2022.

18. The role of Bayesian hidden Markov models in conflict research. *Pre-CAS Workshop on Stability and Change*, Oslo, Norway, May 2022.

17. Research experience at NC State University for undergraduate students. *Seminar*, Department of Mathematics, High Point University, October 2021.

16. Discussion of "A Gibbs sampler for a class of random convex polytopes". *JASA T&M Invited Session, Joint Statistical Meeting*, Seattle, WA, August 2021.

15. Generalized fiducial factor: an alternative to a Bayes factor for forensic identification of source problems. *Joint Statistical Meeting*, Seattle, WA, August 2021.

14. A Bayesian hidden Markov model framework for monitoring and diagnosing critically ill hospital patients. *28th Nordic Conference in Mathematical Statistics*, Tromsø, Norway, June 2021.

13. Generalized fiducial factor: an alternative to a Bayes factor for forensic identification of source problems. *BFF 6.5 – Virtual Workshop on Bayesian, Fiducial, and Frequentist Statistical Inference*, virtual conference hosted on https://researchers.one/, February 2021.

12. The EAS approach for graphical selection consistency in vector autoregression models. *12th International Conference of the European Research Consortium for Informatics and Mathematics Working Group on Computational and Methodological Statistics (CMStatistics 2019)*, University of London, UK, December 2019.

11. The EAS approach for graphical selection consistency in vector autoregression models. *Sixth Bayesian, Fiducial, and Frequentist Conference on Model Uncertainty*, Duke University and SAMSI, May 2019.

10. Non-penalized variable selection in high-dimensional settings via generalized fiducial inference. *Seminar*, Department of Statistics, University of Florida Gainesville, January 2019.

9. Non-penalized variable selection in high-dimensional settings via generalized fiducial inference. *Seminar*, Department of Statistics, Iowa State University, January 2019.

8. Non-penalized variable selection in high-dimensional settings via generalized fiducial inference. *Seminar*, Department of Statistics, University of Illinois Urbana–Champaign, December 2018.

7. Non-penalized variable selection in high-dimensional settings via generalized fiducial inference. *Seminar*, Department of Statistics, North Carolina State University, December 2018.

6. Non-penalized variable selection via generalized fiducial inference. *Graduate Seminar*, Department of Statistics and Operations Research, UNC Chapel Hill, November 2018.

5. Non-penalized variable selection via generalized fiducial inference. *AISC 2018 International Conference on Advances in Interdisciplinary Statistics and Combinatorics*, UNC Greensboro, October 2018.

4. Non-penalized variable selection in high-dimensional settings via generalized fiducial inference. *27th Nordic Conference in Mathematical Statistics*, Tartu, Estonia, June 2018.

3. A Bayesian approach to multi-state hidden Markov models: application to dementia progression. *Graduate Seminar*, Department of Statistics and Operations Research, UNC Chapel Hill, September 2017.

2. Non-penalized variable selection in high-dimensional linear model settings via generalized fiducial inference. *Graduate Seminar*, Department of Statistics and Operations Research, UNC Chapel Hill, February 2017.

1. A Bayesian approach to multi-state hidden Markov models: application to dementia progression. *Tea Time for Science*, Biomedical Statistics and Informatics, Health Sciences Research, Mayo Clinic, Rochester, MN, August 2016.

POSTER PRESENTATIONS

7. A Bayesian hidden Markov model framework for monitoring and diagnosing critically ill hospital patients. *Seventh Bayesian, Fiducial, and Frequentist Conference*, University of Toronto, Canada, May 2022.

6. A statistical primer on classical methods for exoplanet detection. *Statistical Challenges in Modern Astronomy VII conference*, virtual conference, June 2021.

5. Non-penalized variable selection via generalized fiducial inference. *Recycled Poster Session of the North Carolina Chapter of the American Statistical Association*, SAS Campus, NC, September 2019.

4. Non-penalized variable selection via generalized fiducial inference. *Fifth Bayesian, Fiducial, and Frequentist Conference*, University of Michigan Ann Arbor, May 2018.

3. Generalized fiducial inference for high dimensional problems. *Invited Poster Session, Joint Statistical Meeting*, Baltimore, MD, July 2017.

2. Non-penalized variable selection in high-dimensional linear model settings via generalized fiducial inference. *Fourth Bayesian, Fiducial, and Frequentist Conference*, Harvard University, May 2017.

1. Covariance Selection in the Linear Mixed Effect Model. *Feature Extraction: Modern Questions and Challenges, NIPS*, Montreal, Canada, December 2015.

AWARDS

- Thank-a-Teacher Award, NCSU   2022
- LeRoy and Elva Martin Award for Teaching Excellence   2021 - 2022
- Best poster award, *Recycled Poster Session of the NC ASA*   September 2019
- Graduate Student Travel Grant – 1,000 USD   Summer 2018
- Carl M. Erikson Mathematics Department Scholarship   2011 - 2012
- Regents Scholarship   2009 - 2012
- National Scholars Program Scholarship   2008 - 2012
- Leader Award Scholarship   2009 - 2011

TEACHING AND ADVISING

Courses taught:

- Adv. computing for stat. methods (undergraduate; ST 495 NCSU) — Spring '22, '23
- Intro. to prob. and dist. theory (undergraduate; ST 371 NCSU) — Fall '20
- Linear models (graduate; ST 705 NCSU) — Spring '20, '21, '22, '23
- Fundamentals of statistical inference II (graduate; ST 502 NCSU) — Fall '19
- STOR-BIOS grad student boot camp (real analysis section; UNC) — Summer '17
- Intro. to statistics (first year undergraduate; STOR 155 UNC) — Spring '16, Fall '16
- Tutor (economics and mathematics undergraduate; EMU) — '09 - '12

PhD students advised/co-advised:

7. Neil Dey (NCSU; expected graduation Summer 2025)
6. Emmett Kendall (NCSU; expected graduation Summer 2025)
5. Mohamed Abba (NCSU; expected graduation Fall 2023)
4. Naomi Giertych (NCSU; expected graduation Summer 2024)
3. Jimmy Hickey (NCSU; expected graduation Summer 2024)
2. Alexander Murph, PhD, UNC Chapel Hill — 2023
1. Salil Koner, PhD, NCSU — 2021

PhD committees served on:

8. Matthew Singer (NCSU; expected graduation Summer 2024)
7. Xinyu Zhang (NCSU; expected graduation Summer 2024)
6. Ian Grace (NCSU; expected graduation TBD)
5. Alvin Sheng (NCSU; expected Spring 2024)
4. Annie Tang, PhD, NCSU — 2023
3. Kang Wang, PhD, NCSU — 2023
2. Yin-Jen Chen, PhD, NCSU — 2022
1. Pei-Shien Wu, PhD, NCSU — 2022

Undergraduate students mentored:

5. Jack Ferrell (University of Florida; REU student 2021)
4. Carolina Kapper (High Point University; REU student 2021)
3. Maxwell Lovig (University of Louisiana, Lafayette; REU student 2021)
2. Emiliano Planchon (NCSU; REU student 2021)
1. Pragya Haravu (NCSU; expected graduation 2023)

DEPARTMENT SERVICE

- Admissions committee NCSU — 2023-2024
- Search committee NCSU — 2022-2023
- Seminar committee NCSU — Spring 2021, Fall 2021
- Qualifying exam committee NCSU — Aug '20, '23, Jan '21, '22

COMPUTING SKILLS

R, Python, Julia, Linux, HPC environments