

# Andrew M. Raim

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Statistician with experience in computing and software development. Research has focused on statistical computing, finite mixtures, flexible models for over- and underdispersion, and applied modeling problems.

## A. Education

- Ph.D. Statistics, UMBC<sup>†</sup>, Spring 2014, Dissertation: *Computational Methods for Finite Mixtures using Approximate Information and Regression Linked to the Mixture Mean*. Advisor: Nagaraj K. Neerchal.
- M.S. Statistics, UMBC, Fall 2011.
- M.S. Computer Science, UMBC, Fall 2007.
- B.S. Computer Science, UMBC, Spring 2002.

## B. Work Experience

**U.S. Census Bureau.** June 2014 to Present. Research Mathematical Statistician at the Center for Statistical Research and Methodology. Collaborate with interdisciplinary teams on projects involving data analysis, computing, frequentist and Bayesian modeling, prediction, and use of agency data to inform field operations and enhance data products. Consult on the use of both established and novel statistical techniques for applied problems. Provide reusable implementations of nonstandard methods as R software packages. Pursue research in general purpose methodology involving statistical computing and modeling. Document efforts in manuals, technical reports, and peer-reviewed journals.

**UMBC Department of Mathematics and Statistics.** Fall 2008 to Spring 2014. Graduate Assistant.

- Assisted Dr. Matthias K. Gobbert at UMBC High Performance Computing Facility, between Fall 2009 – Spring 2014. Activities included development of center web site, participation in summer *Interdisciplinary Program in High Performance Computing* REU, coauthoring technical reports demonstrating cluster performance and statistical computing, and providing support to user community.
- Instructor for STAT 350 *Statistics with Applications in the Biological Sciences* (Winter 2013, hybrid course with online material and in-person discussion). Teaching Assistant for STAT 350 *Statistics with Applications in the Biological Sciences* (Spring 2009) and STAT 351 *Applied Statistics for Business and Economics* (Fall 2008).

**Advertising.com.** Sept 2002 to Aug 2008. Software engineer in technology department of fast-paced internet advertising company. Developed and maintained software components in production system to process stream of incoming transaction data. Programmed in C++ and Java using object-oriented design, database queries, and shell scripting. Engineering activities included code development, adherence to standards and best practices, design of software components and data structures, source control management, unit and system level testing, conducting code and document reviews, and authoring and maintaining documentation. Negotiated scope and timeline for features and other changes for releases. Investigated, documented, and resolved irregularities in production data using SQL, shell scripts, and other tools in Linux and Windows environments.

**UMBC Office of Information Technology.** Feb 1999 to Nov 2001. Provided first tier customer support to campus community at helpdesk. Assisted users with common issues involving computer labs and accounts; guided users through troubleshooting procedures.

## C. Selected Papers

- [1] Andrew M. Raim, James A. Livsey, and Kyle M. Irimata. Rejection sampling with vertical weighted strips. Under Revision, 2024+. Preprint: <https://arxiv.org/abs/2401.09696>.
- [2] Andrew M. Raim. Direct sampling with a step function. *Statistics and Computing*, 33(1), 2023.

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<sup>†</sup>UMBC: University of Maryland, Baltimore County.

- [3] Andrew M. Raim, Thomas Mathew, Kimberly F. Sellers, Renee Ellis, and Mikelyn Meyers. Design and sample size determination for experiments on nonresponse followup using a sequential regression model. *Journal of Official Statistics*, 39(2):173–202, 2023.
- [4] Darcy Steeg Morris, Andrew M. Raim, and Kimberly F. Sellers. A Conway-Maxwell-multinomial distribution for flexible modeling of clustered categorical data. *Journal of Multivariate Analysis*, 179:104651, 2020.
- [5] Andrew M. Raim, Nagaraj K. Neerchal, and Jorge G. Morel. An extension of generalized linear models to finite mixture outcome distributions. *Journal of Computational and Graphical Statistics*, 27(3):587–601, 2018.
- [6] Andrew M. Raim, Nagaraj K. Neerchal, and Jorge G. Morel. An approximation to the information matrix of exponential family finite mixtures. *Annals of the Institute of Statistical Mathematics*, 69(2):333–364, 2017.

## D. Organizations & Service

- Member of American Statistical Association (ASA).
- Refereed papers for American Statistician, Biometrical Journal, BMC Medical Research Methodology, Communications in Statistics: Theory and Methods, Communications in Statistics: Simulation and Computation, Computational Statistics and Data Analysis, Hacettepe Journal of Mathematics and Statistics, Heliyon, International Journal of Data Science and Analytics, Journal of Statistical Computation and Simulation, Scientific Reports, Statistical Analysis and Data Mining, Statistical Methodology, Statistics and Computing, Statistics and Operation Research Transactions, and Mathematical Population Studies.
- Member of PhD committee for Elias Al-Najjar (UMBC 2015), Marilena Flouri (UMBC 2016), and Sai Popuri (UMBC 2017). Reader for Qing Ji (UMBC 2019), Reetam Majumder (UMBC 2021), and Nadeesri Wijekoon (UMBC 2021).

## E. Computing Skills

- R for statistical and numerical computing. Includes associated tools such as Rstudio, Rcpp, Roxygen, and Quarto. Experience authoring packages and preparing for CRAN. ★★★★★
- Linux environment. ★★★★★
- Document preparation in LaTeX and Markdown, including articles, posters, slides, websites, and package APIs. ★★★★★
- Source control with Git; past experience with Subversion and CVS. ★★★★★
- Data wrangling and exploration with tidyverse, ggplot, SQL. ★★★
- Software development in C, C++ with Standard Template Library; past experience with Java. ★★★
- Bayesian computing with Stan. ★★★
- Shell scripting with Bash and Python; past experience with Perl. ★★★
- Technical computing with Julia and Python. ★★
- Parallel computing on HPC clusters. Includes MPI with C/C++; SNOW, Rmpi, and pbdR packages for R; PBS and SLURM schedulers. ★
- Data processing and analysis with SAS. ★

More ★’s indicate more frequently and recently used.