

# Christopher J. Urban

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🌐 <https://cjurban.github.io/>

*I am an incoming Assistant Professor of Quantitative Psychology at University of Rhode Island.  
I work on developing and disseminating machine learning methods for social data science.*

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## Professional Experience

- 2023–Present **Assistant Professor of Quantitative Psychology**, Department of Psychology, University of Rhode Island.
- 2022–2023 **Statistical Consultant**, Department of Psychology and Neuroscience, UNC-Chapel Hill.
- Provide consulting services to social scientists including discussion of research goals, planning for data collection, and guidance on implementation and interpretation of statistical models
- 2018–2019 **Research Assistant**, *The Finish Line Project*, UNC-Chapel Hill.
- Developed a machine learning model for predicting student performance in a large undergraduate course, then deployed the model to intervene for at-risk students

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## Education

- 2017–2023 **Ph.D.**, *Quantitative Psychology*, University of North Carolina at Chapel Hill.  
Minor in Statistics and Operations Research  
Advisor: Daniel Bauer
- 2017–2021 **M.A.**, *Quantitative Psychology*, University of North Carolina at Chapel Hill.
- 2012–2016 **B.S.**, *Psychology*, Stony Brook University.  
Minor in Mathematics; Concentrations in Mathematics and Physics
- 2010–2011 **A.A.**, *Humanities and Social Sciences*, Onondaga Community College.

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## Funding

- 2019–Spring 2022 **National Science Foundation Graduate Research Fellowship; \$138,000**

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## Publications

### Refereed Articles

Kilian, P., Leyhr, D., **Urban, C.J.**, Höner, O. P., & Kelava, A. (2023). A deep learning factor analysis model based on importance-weighted variational inference and normalizing flow priors: Evaluation within a set of multidimensional performance assessments in youth elite soccer players. *Statistical Analysis and Data Mining: The ASA Data Science Journal*. 1–14.

Arizmendi, C. J., Bernacki, M. L., Rakovic, M., Plumley, R. D., **Urban, C.J.**, Panter, A. T., ... Gates, K. M. (2022). Predicting student outcomes using internet logs of learning behaviors: Review, current standards, and suggestions for future work. *Multivariate Behavioral Research*.

**Urban, C. J.** & Bauer, D. J. (2021). A deep learning algorithm for high-dimensional exploratory item factor analysis. *Psychometrika*. 86 (1), 1–29.

**Urban, C. J.** & Gates, K. M. (2021). Deep learning: A primer for psychologists. *Psychological Methods*. 26 (6), 743–773.

Greene, J. A., Plumley, R. D., **Urban, C. J.**, Bernacki, M. L., Gates, K. M., Hogan, K. A., Demetriou, C., & Panter, A. T. (2019). Modeling temporal self-regulatory processing in a higher education biology course. *Learning and Instruction*.

### Under Review

Debelak, R. & **Urban, C.J.** (under review). An evaluation of deep learning approaches for factor analysis of response and response time data. *Psychometrika*.

### In Preparation

**Urban, C.J.** & Bauer, D. J. (in preparation). Modeling intensively measured, longitudinal, and multidimensional item responses: Capturing continuous-time latent change processes via neural stochastic differential equations.

**Urban, C.J.** (in preparation). High-dimensional item factor analysis with estimation of the latent population distribution via normalizing flows.

**Urban, C.J.** & Bauer, D. J. (in preparation). Deep learning-based estimation and goodness-of-fit for large-scale confirmatory item factor analysis.

### Book Chapters

Arizmendi, C. J., **Urban, C. J.** & Gates, K. M. (in press). Deep learning methods for mobile sensing. In Mehl, M. R., Eid, M., Wrzus, C., Harari, G. M., & Ebner-Priemer, U. W. (Eds.), *Mobile Sensing in Psychology: Methods and Applications*. Guilford Press.

Eaton, N. R. & **Urban, C. J.** (2018). Parental monitoring. In *Encyclopedia of Adolescence* (2nd ed., pp. 2666–2679). Springer.

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## Statistical Software

**Urban, C. J.** & He, S. (2022). DeepIRTools: Deep learning-based estimation and inference for large-scale item response theory. Python package. <https://github.com/cjurban/deepirtools>

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## Teaching Experience

October 2022 **Instructor**, *The Methods Center at the Faculty of Economics and Social Sciences*, Eberhard Karl University of Tübingen.

Workshop Title: Foundations of Deep Learning for the Social Sciences

Website: [https://cjurban.github.io/workshops/deep\\_learning\\_social\\_sciences/intro.html](https://cjurban.github.io/workshops/deep_learning_social_sciences/intro.html)

- Prepared and instructed a two-day workshop designed to introduce foundational deep learning concepts and methods to social scientists

Fall 2017 **Teaching Assistant**, *Department of Psychology and Neuroscience*, UNC-Chapel Hill.

Course Title: Statistical Principles in Psychological Research

- Developed and led exercises to teach basic statistical methods for data analysis

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## Invited Talks

February 2023 **Urban, C. J.** *Deep learning and psychometrics: A fruitful new synthesis*. Virtual talk given at the Quantitative Psychology Brown Bag in the School of Psychology at Georgia Institute of Technology, Atlanta, GA.

October 2021 **Urban, C. J.** *Deep learning and psychometrics: A fruitful new synthesis*. Virtual talk given at the Methods Center in the Faculty of Economics and Social Sciences at Eberhard Karl University of Tübingen, Tübingen, Germany.

October 2021 **Urban, C. J.** *Deep learning and psychometrics: A fruitful new synthesis*. Virtual talk given at the QuantDev Brown Bag in the College of Health and Human Development at The Pennsylvania State University, University Park, PA.

September 2021 **Urban, C. J.** *Deep learning and psychometrics: A fruitful new synthesis*. Virtual talk given at the Quantitative Methods Colloquium Series in the Department of Psychology and Human Development at Vanderbilt University, Nashville, TN.

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## Awards & Honors

- April 2019 **Trainee Travel Award, BRAIN Initiative Investigator's Meeting; \$1,000**  
May 2018 **Society of Multivariate Experimental Psychology Workshop Travel Award; \$1,000**  
May 2018 **Dashiell Student Travel Award; \$800**  
2012–2016 **Stony Brook University Dean's List**  
2010–2011 **Onondaga Community College President's List**

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## Service

- 2022–2023 **Reviewer**, *Psychometrika*.  
2022–2023 **Reviewer**, *Multivariate Behavioral Research*.  
2021 **Student Coordinator**, Quantitative Psychology Forum, UNC-Chapel Hill.  
2020–2021 **Reviewer**, *British Journal of Mathematical and Statistical Psychology*.  
2021 **Reviewer**, *Journal of Social and Personal Relationships*.

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## Conference Papers and Presentations

- April 2020 Bernacki, M. L., **Urban, C. J.**, Plumley, R., Luo, L., Gates, K., Panter, A., & Greene, J. A. *Leveraging campus data, learning theory, and educational data mining to predict achievement before students begin to fail*. Poster presented at the annual meeting of the American Educational Research Association, San Francisco, CA. (Conference cancelled)
- April 2019 **Urban, C. J.**, Fisher, Z. F., Parsons, J., Girault, J. B., Hopfinger, J. B., & Gates, K. M. *Classifying individuals based on within-network connectivity*. Poster presented at the BRAIN Initiative Investigator's Meeting, Washington, DC.
- April 2019 Girault, J. B., Arizmendi, C., Fisher, Z. F., **Urban, C. J.**, Piven, J., & Gates, K. M. *Identifying age-related functional connectivity features across different levels of spatial resolution: An application of multi-scale GIMME*. Poster presented at the BRAIN Initiative Investigator's Meeting, Washington, DC.
- April 2019 Greene, J. A., **Urban, C. J.**, Plumley, R. D., Bernacki, M. L., Gates, K. M., Hogan, K. A., Demetriou, C., & Panter, A. T. *Theory-driven data mining to understand self-regulated learning processing in a higher education biology course*. Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada.
- May 2018 **Urban, C. J.**, Bernacki, M. L., Plumley, R. D., Gates, K. M., Demetriou, C., Panter, A. T., Hogan, K. A., & Greene, J. A. *A supervised data mining approach for identifying behavior sequences related to academic performance*. Poster presented at the Modern Modeling Methods Conference, Storrs, CT.
- November 2015 Taggart, T. C., **Urban, C. J.**, Reisner, S. L., & Eaton, N. R. *Correlates of sexual attraction and behavior with transgender individuals*. Poster presented at the annual meeting of the Society for the Scientific Study of Sexuality, Albuquerque, NM.