Christopher J. Urban

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I am a sixth year Ph.D. candidate in Quantitative Psychology at UNC-Chapel Hill.
My research aims to develop and disseminate machine learning methods for social data science.

Education

2017–2023 (Expected) **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.
Advisor: Daniel Bauer
Thesis: Machine learning-based estimation and goodness-of-fit for large-scale confirmatory item factor analysis

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.

Funding

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

Publications

Refereed Articles

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*.

Bernacki, M.L., **Urban, C.J.**, Raković, M., Plumley, R.D., Luo, L., Gates, K.M., . . . Greene, J.A. (under review). Leveraging learning analytics to support postsecondary students equitably. *American Educational Research Journal*.

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.

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`

Professional Experience

2022–Present **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

Summer 2018 **Research Assistant**, *Department of Psychology and Neuroscience*, UNC-Chapel Hill.
- Investigated methods for clustering individuals using brain network connectivity patterns

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`
- 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

Invited Talks

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 Brownbag 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.

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**

Service

2022 **Reviewer**, *Multivariate Behavioral Research*.

2022 **Reviewer**, *Psychometrika*.

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*.

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.