

# Sanford R. Student

---

914.610.0478 | [srstu@udel.edu](mailto:srstu@udel.edu) | <https://www.sanfordrstudent.com>

## Position

**Assistant Professor, Educational Statistics and Research Methods | School of Education, College of Education and Human Development, University of Delaware | 2023-present**

- Resident faculty, University of Delaware Data Science Institute
- Faculty affiliate, Center for Research in Education and Social Policy

## Education

**Ph.D., Research and Evaluation Methodology | School of Education, University of Colorado Boulder | May 2023 | Boulder, CO |**

**Dissertation: *Bridging gaps between psychometric research and practice in U.S. K-12 education (three article model)***

- Advisors: Drs. Derek Briggs (dissertation committee chair) and Benjamin Shear

**A.B. Philosophy & A.B. Computer Science | May 2013 | Brown University | Providence, RI**

---

## Peer-Reviewed Publications

- **Student, S. R. & Gong, B. (2022).** Supporting the interpretive validity of student-level claims in science assessment with tiered claim structures. *Educational Measurement: Issues and Practice*, 41(4). <https://doi.org/10.1111/emip.12523>
  - **Student, S. R. (2022).** Vertical scales, deceleration, and empirical benchmarks for growth. *Educational Researcher*, 51(8). <https://doi.org/10.3102/0013189X221105873>
  - **Student, S. R. (2022).** Appraising traditional and purpose-built person fit statistics' power to detect cheating. *Chinese/English Journal of Educational Measurement and Evaluation*, 3(1). <https://doi.org/10.59863/GYPV1534>
- 

## Papers under Review and Revision

- **Student, S. R.** Empirical growth benchmarks and the role of scale choice. *Journal of Research on Educational Effectiveness*. (Revision 1)

- **Student, S. R.**, Briggs, D.C. and L. Davis. The sensitivity of growth across grades to vertical scale common item linking design. *Educational Measurement: Issues and Practice*. (Under revision after first review)
- 

## Papers under Development

- **Student, S.R.** Validating, calibrating and linking vertical scales with moderated factor models.
  - **Student, S.R.** & Snipes-Rea, J. Evidence of score inflation on recent math and reading tests.
  - **Student, S.R.** Structural equation approaches to modeling growth within and across academic years on a vertical scale.
  - **Student, S.R.** & Myers, M. Dynamic Rasch item difficulty calibration from non-randomly assigned small quizzes.
- 

## Grants

- Barnes, T. (PI) & **Student, S.R.** (co-PI). *Emotion Mastery Inventory*. Assessment for Good (unfunded).
- 

## Selected Professional Reports and Other Written Works

- Lyons, S. & **Student, S.R.** (2023). *A framework for reimagining school accountability*. Lyons Assessment Consulting. [https://www.lyonsassessmentconsulting.com/assets/files/Lyons-Student\\_AFrameworkforReimaginingSchoolAccountability.pdf](https://www.lyonsassessmentconsulting.com/assets/files/Lyons-Student_AFrameworkforReimaginingSchoolAccountability.pdf)
- Wellberg, S., Briggs, D. C., & **Student, S. R.** (2023). *Big ideas in the understanding of fractions: A learning progression*. Center for Assessment, Design, Research and Evaluation (CADRE). <https://www.colorado.edu/cadre/2023/03/22/big-ideas-understanding-fractions-learning-progression>
- Lyons, S. and **Student, S. R.** (2022). *Leaps for Equitable, 21<sup>st</sup> Century Learning: 2022 Technical Report*. Lyons Assessment Consulting and Transcend. <https://www.lyonsassessmentconsulting.com/assets/files/Leaps-StudentVoiceSurveyTechnicalManual-June2022.pdf>
- **Student, S.R.** (2022). Making large-scale science assessment meaningful. *Next Gen Navigator*. <https://www.nsta.org/blog/making-large-scale-science-assessment-meaningful>
- Lyons, S., Hinds, B. F., **Student, S. R.**, & Denker, H. (2022). *ISR Language Evaluation: Gathering Stakeholder Feedback to Make Community-Informed Program Improvements*. Cognia and Lyons Assessment Consulting. [https://www.lyonsassessmentconsulting.com/assets/files/ISR-LanguageEvaluationReport\\_ADA002.pdf](https://www.lyonsassessmentconsulting.com/assets/files/ISR-LanguageEvaluationReport_ADA002.pdf)
- Shear, B.R., Diaz-Bilello, E., **Student, S. R.**, and Pierre-Louis, M. (2021). *Evaluation of Colorado School Turnaround Network and School Turnaround Leadership Development Grants: Descriptive analysis of 2015-2020 cohorts*. The Center for Assessment, Design,

Research and Evaluation (CADRE).

[https://www.colorado.edu/cadre/sites/default/files/attached-files/evaluation\\_of\\_colorado\\_school\\_turnaround\\_network\\_and\\_school\\_turnaround\\_leadership\\_development\\_grants-descriptive\\_analysis\\_of\\_2015-2020\\_cohort\\_feb\\_2021.pdf](https://www.colorado.edu/cadre/sites/default/files/attached-files/evaluation_of_colorado_school_turnaround_network_and_school_turnaround_leadership_development_grants-descriptive_analysis_of_2015-2020_cohort_feb_2021.pdf)

---

## Conference Papers and Presentations

- **Student, S.R.** (2024, April). *Validating, Calibrating and Linking Vertical Scales with Moderated Item Response Theory*. Paper accepted for presentation at the NCME Annual Meeting, Philadelphia, PA.
- **Student, S.R.**, Briggs, D.C. & Davis, L. (2024, April). *Vertical scale design and years of learning*. Paper accepted for presentation at the NCME Annual Meeting, Philadelphia, PA.
- **Student, S.R.**, Banjanovic, E., Minchen, N., Rome, L. & Daisher, T. *Item parameter estimation from short student quizzes*. In Rome, L. (session organizer), *Assessment and Instruction Coherence for Dynamic Measurement of Student Proficiency*. Accepted for presentation at the NCME Annual Meeting, Philadelphia, PA.
- **Student, S.R.** (2023, December). *Empirical tests of the assumptions underlying growth measurement in vertical scaling*. In Hartel, D. and Kanopka, K. (session organizers), *Applied statistical and psychometrics issues in measurement*. Presentation at the Conference on Computational and Methodological Statistics, Berlin, DE.
- **Student, S.R.** (2023, April). *What's in a year: Updated annual growth trends on vertically scaled tests*. Paper presented at the NCME Annual Meeting, Chicago, IL.
- **Student, S.R.** & Briggs, D.C. (2023, April). *Investigating the relationship between linking direction and growth magnitudes in vertical scaling*. Paper presented at the International Objective Measurement Workshop, Chicago, IL.
- Furtak, E.M., Deverel-Rico, C. & **Student, S.R.** (2023, April). *How can crosscutting concepts organize formative assessments across science classrooms? Results of a video study*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.
- **Student, S. R.**, Lyons, S., Shoukry, Y., Nitkin, D. & Picucci, A. (2022, October). *Leaps: an assessment system for tracking school transformation and student learning experiences*. Paper presented at the Northeast Educational Research Association Annual Conference, Trumbull, CT.
- **Student, S. R.** (2022, April). *Calibrating and validating the uses of a vertical scale in a computerized adaptive setting*. In Briggs, D.C. (session organizer), *A Content-Referenced Approach to the Interpretation of Growth*. Presentation given at the NCME Annual Meeting, San Diego, CA.
- Lyons, S., Hinds, F., **Student, S. R.** & Denker, H. (2022, April). *Developing culturally responsive items for an urban district interim assessment program*. Paper presented at the annual meeting of the American Educational Research Association (AERA), San Diego, CA.
- Wellberg, S., Briggs, D.C., & **Student, S. R.** (2022, April). *Synthesizing big ideas in the understanding of fractions: A learning progression*. Paper presented at the annual meeting of the American Educational Research Association (AERA), San Diego, CA.

- **Student, S. R.** (2021, October). *Reviewing the implications of vertical scaling issues for empirical growth benchmarks*. Paper presented at the Northern Rocky Mountain Education Research Association Annual Meeting, Ketchum, ID.
  - **Student, S. R.** (2021, July). *A comparison of the power of four traditional and four purpose-built person fit statistics to detect cheating*. Poster presented at the International Meeting of the Psychometric Society, conducted remotely.
  - **Student, S. R. & Gong, B.** (2021, June). *Tiered claims: A new approach to claims about students in NGSS assessment*. Poster presented at the annual meeting of the National Council on Measurement in Education (NCME), conducted remotely.
  - Deverel-Rico, C. & **Student, S. R.** (2021, June). *Towards an approach for evaluating equity in UTeach*. Presentation at the UTeach STEM Educators Virtual Conference Equity and Racial Justice in STEM Teacher Development Virtual Summit.
  - **Student, S. R. & Gong, B.** (2021, April). *Supporting the interpretive validity of student-level claims in science assessment with tiered claims structures*. Paper presented at the annual meeting of the American Educational Research Association (AERA), conducted remotely.
  - **Student, S. R., Briggs, D., Toutkoushian, E. & Confrey, J.** (2020, April). *Keeping it on the level: Using learning trajectories for diagnostic inferences*. Paper presented at the 2020 International Objective Measurement Workshop, Berkeley, CA (conference conducted remotely in 2021).
  - **Student, S. R. & Burkhardt, A.** (2019, September). *Making inferences from PBICs to the learning progression*. In Briggs, D.C. (session organizer), *Learning Progressions and NGSS*. Presentation given at the NCME Special Conference on Classroom Assessment, Boulder, CO.
- 

## Invited talks

- **Student, S.R.** (2022, November). *Studies in student growth as context for effect sizes*. Presentation to the University of Delaware School of Education.
  - Shear, B. R. & **Student, S. R.** (2022, March). *Guidance on effect size interpretation in educational research: Part 2*. Presentation to the Association of Colorado Educational Evaluators.
  - Shear, B. R. & **Student, S. R.** (2022, February). *Guidance on effect size interpretation in educational research*. Presentation to the Association of Colorado Educational Evaluators.
- 

## Research and Relevant Work Experience

### Research roles

*Doctoral Researcher | Center for Assessment Design, Research and Evaluation | August 2018-May 2023 | Boulder, CO*

- Using qualitative methods, investigated the adoption of a Math-Mapper 6-8, a learning trajectory-based digital formative assessment tool for middle school math.

- Investigated research questions related to the measurement of student learning on formative assessment tasks aligned to a learning progression based on the Next Generation Science Standards (NGSS).
- Investigated technical properties of Colorado student growth percentiles (SGPs) and conducted research leveraging SGP data.
- Investigated the efficacy of school improvement interventions in Colorado using statewide achievement data.
- Contributed to the development of the Content-Referenced Growth concept based upon analysis of the Curriculum Associates i-Ready assessment software. Included both developing an interactive reporting prototype and investigating the technical properties of the i-Ready vertical scale.
- Conducted analyses pertaining to the effect of the COVID-19 pandemic on Colorado students' test performances and opportunity to learn.
- Conducted data analysis related to the use of performance-based assessment in Colorado schools.

*Summer intern | National Center for the Improvement of Educational Assessment | June 2020-August 2020 | Dover, NH (completed remotely due to COVID-19)*

- Analyzed the current science assessment practices of several American states through the lens of validity arguments.
- Developed a series of pragmatic recommendations for improving the interpretive validity of assessment in the context of the Next Generation Science Standards (NGSS).
- Introduced the concept of tiered claims to improve the evidentiary basis for student-level claims based upon large-scale science assessment.
- Analyzed the reliability of accountability scores under a new accountability system being introduced in Kentucky.

## **Consulting roles**

*Research Associate | Lyons Assessment Consulting | July 2021-July 2023 | Wayland, MA (remote position)*

- Conducted invariance, reliability, and dimensionality analyses to support development of classroom assessments of students' perceptions of the school environment. Coauthored an initial technical manual for the survey tools. Continuing to run analyses finalizing assessments for open-source scale publication and a peer-reviewed research paper.
- Supported a research study investigating the effect of culturally responsive reading assessments on students' feeling valued in a large urban school district.
- Designed a research study for a mid-Atlantic state seeking to understand how best to revise their Achievement Level Descriptors to be more encouraging for students, especially historically underserved students. Conducted all quantitative analyses of results and coauthored final report.
- Conducted a series of item-level analyses of grade 3-8 mathematics assessment data for a mid-Atlantic state seeking to understand patterns in student performance on year-end, large-scale assessments.
- Co-authored a series of briefs on the use of performance assessments in state science assessments systems.

- Coordinated review of psychometric evidence for claims/uses of popular interim assessments.
- Developing and conducting a two-part study of the effect of culturally relevant mathematics items on student assessment performance and experiences.
- Providing technical input to an alternate school accountability project for the Center for Innovation in Education and the Kentucky Department of Education.
- Co-authored a series of briefs on performance assessment.

*Lead researcher, Commission on the Future of Legal Education Bar Exam study | American Bar Association | May 2019-January 2020 | Boulder, CO*

- Combined data collected from seven sources to construct the first publicly available dataset of state level Bar Exam outcomes, taker characteristics and exam characteristics from 2009-2018.
- Designed and conducted descriptive and regression analyses to identify factors associated with state-level pass rate trends from 2009-2018 and author report on findings.

### **Relevant prior professional experience**

*Software Engineer | edX | February 2016-August 2018*

- Conducted and analyzed randomized trials to determine the efficacy of small changes to the edX student workflow using Python.
- Planned, developed and tested features of edX's course authoring and course-taking online interfaces.

---

## **Teaching Experience**

**Instructor of Record | Survey Design for the Social Sciences | School of Education, University of Delaware | Fall 2023**

- Course evaluations pending

**Teaching Assistant | Quantitative Methods I | School of Education, University of Colorado Boulder | Fall 2019**

**Teaching Assistant | Introduction to Object-Oriented Programming in Java | Brown University | Fall 2010, Fall 2011**

---

## **Service and review work**

### **Professional organization service**

#### *National Council on Measurement in Education*

- Reviewer and Discussant, 2023 NCME Annual Meeting
- Current member, NCME Archives Committee
- 2022-23 graduate student member, NCME Archives Committee
- Session Chair, 2022 NCME Annual Meeting
- 2x Reviewer/member, NCME Career Contributions Award Committee, 2021 & 2022
- Conference Room Manager, 2021 NCME Annual Meeting (conducted virtually)

#### *American Educational Research Association*

- Reviewer, Test Validity SIG, 2024 AERA Annual Meeting
- Reviewer, Test Validity SIG, 2023 AERA Annual Meeting
- Reviewer, Division D, 2022 AERA Annual Meeting
- Reviewer, Test Validity SIG, 2022 AERA Annual Meeting

#### *Other professional organization service*

- Discussant, 2022 Northeastern Educational Research Association Annual Conference
- Session chair, 2022 Northeastern Educational Research Association Annual Conference
- Reviewer, 2022 Northeastern Educational Research Association Annual Conference
- Reviewer, 2021 Northern Rocky Mountain Education Research Association Annual Conference

### **Journal peer review service**

- *Journal of Educational Measurement*
- *Educational Measurement: Issues and Practice*
- *Journal of Research on Educational Effectiveness*

### **Department and other service**

#### *University of Delaware*

- Member, Faculty Affairs Committee
- Search committee member, Educational Statistics and Data Science assistant professor

#### *Prior institutions*

- Member, student committee, 2022 School of Education doctoral core curriculum revision
- Co-creator, introductory R performance task for incoming doctoral students
- Reviewer, Schools of Opportunity Recognition Program 2019

---

## Honors

- Selected attendee, AIR/NCES Winter 2020 NAEP Data Training Workshop, Arlington, VA.
- 

## Computer and Programming Skills

- **R:** I do most of my statistical analysis and data visualization work in R. I am proficient at creating RMarkdowns, and have experience making simple Shiny apps.
- **MPlus:** I have experience fitting and interpreting a variety of structural equation models in MPlus.
- **Javascript:** I have substantial professional experience using Javascript and continue to use it for more complex visualizations, such as a prototype score reporting system using learning progressions to support content-referenced growth interpretations.
- **Stata:** I have conducted research assistant work in Stata and taught Stata to first-semester doctoral students with widely varying levels of coding experience.
- **Python:** I used Python professionally at edX, including data analysis using the *pandas* package.
- **Git/github and version control:** I have extensive professional experience using Github and SVN for version control, and continue to use Github to manage more complicated coding projects, such as the content-referenced growth prototype score reporting system.

## Methodological Training: Relevant Graduate Coursework

### Psychometrics, statistics and relevant applications

- **Quantitative Methods I and II:** research design, statistical inference, hypothesis testing, and linear regression applied to the context of education research.
- **Testing and Assessment in American Schools:** history of, and recent issues in, large-scale and classroom assessment in the United States.
- **Foundations of Measurement:** philosophy of measurement, early-mid 20<sup>th</sup> century psychological measurement models, issues in reliability and validity.
- **Measurement in Survey Research:** classical test theory, construct mapping and designing survey instruments, the Rasch model.
- **Experimental & Quasi-Experimental Design for Causal Inferences:** issues in causal inference in non-random settings, instrumental variables, difference-in-differences analysis, comparative interrupted time series, sharp and fuzzy regression discontinuities, matching, fixed effects, value-added models.
- **Probability Theory:** combinatorics, probability, continuous and discrete random variables, probability density and cumulative distribution functions, properties of common distributions, joint distributions, properties of expectation, central limit theorem.



- **Categorical Data Analysis:** Logistic and probit regression, factor analysis, principal component analysis, data simulation.
- **Advanced Topics in Measurement:** calibrating 1-, 2-, 3-PL IRT models for both dichotomous and polytomous responses, assessing model fit and dimensionality, IRT parameter estimation, differential item functioning, linking and equating, vertical scaling, computer adaptive testing.
- **Hierarchical Linear Modeling:** Specification, estimation and interpretation of multilevel models, including extensions such as generalized linear models.
- **Mathematical Statistics:** Common distributions, confidence intervals, hypothesis testing, method of moments estimators, maximum likelihood estimators, uniformly minimum variance unbiased estimators, uniformly most powerful tests, generalized likelihood ratio tests.
- **Latent Variable Modeling:** exploratory and confirmatory factor analysis, structural equation modeling with applications to education, psychology and behavioral science.
- **Educational Evaluation:** systematic approaches to program evaluation, experimental and quasi-experimental designs using mixed methods, methodological and theoretical issues in evaluation.
- **Advances in Assessment:** equity, language, and learning theory issues in classroom assessment, with some limited applications to large scale assessment.
- **Advances Structural Equation Modeling:** growth models and related approaches, categorical latent variable models, latent variable interactions, exploratory structural equation modeling; in R and MPlus.

### Other education coursework

- **Perspectives on Classroom Teaching and Learning:** introduction to a wide variety of research paradigms in education: behavioral, cognitive, sociocognitive, sociocultural, and critical theories.
  - **Qualitative Methods I and II:** introduction to qualitative research with an emphasis on ethnography, including conducting a small-scale independent qualitative study.
  - **Research on Equity-Focused Programs in STEM:** review of recent theoretical and empirical research on racial and gender equity in STEM education.
-