## DR ABHIK ROY



#### **EDUCATION**

Western Michigan University Ph.D. in Program Evaluation

Kalamazoo, MI

Dissertation, Building an Evaluation Model of Academic Advising's Impact on Progression, Persistence, and Retention Within University Settings

Michigan Technological University M.S. in Mathematics

• Houghton, MI

Thesis. Quotient Rings of the Eisenstein Integers

West Virginia Wesleyan College B.S. in Mathematics

Buckhannon, WV

Terminal Study. 4-Cell Embedding on a n-genus Torus

### PROFESSIONAL EXPERIENCE

Current 2024

- Associate Research Scientist Indiana University
  - · Conducting Rigorous Data Analysis. Applying statistical and qualitative analysis tools to analyze and interpret data, leading to findings that advance knowledge and inform discourse.
  - · Creating Accessible Data Visualizations Designing clear and accessible data visualizations to effectively communicate research findings to diverse audiences, ensuring usability for individuals with varying abilities.
  - · Developing Competitive Research Proposals. Leading the development of grant proposals, articulating research objectives, methodologies, and timelines to secure external funding.
  - Employing Advanced Research Methods. Engaging in both quantitative and qualitative methodologies to design studies that address complex academic and policy-related questions.
  - · Engaging with Academic and Community **Stakeholders**. Building relationships with funders, community partners, and academic colleagues to align research initiatives with broader societal goals.

- Bloomington, IN
- · Facilitating Stakeholder Collaboration. Collaborating with external partners to ensure research findings are relevant to real-world applications and policy development.
- · Fostering Collaborative Research. Leading efforts to engage interdisciplinary teams in generating innovative solutions and advancing research impact.
- · Managing Research and Evaluation **Projects**. Overseeing the implementation of research and evaluation projects, ensuring timely completion, adherence to budgets, and alignment with study goals.
- · Presenting Research Findings. Developing and delivering presentations and scholarly publications that communicate research findings, methods, and implications to academic and interdisciplinary audiences.
- · Translating Research into Policy and Practice. Utilizing research insights to inform the development and evaluation of policies, programs, and scholarly debates.

#### CONTACT INFORMATION

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+1 304-554-9436

0000-0002-7085-8964

#### **EXPERTISE**

**Data visualization** 

Program evaluations integrating both traditional and machine learning methods

Quantitative, qualitative, and mixed method studies

programming

Social network analysis

Survey design, administration, and research

Statistical modeling and analysis

**Text analytics** 

Web application development and static/dynamic reporting using





2023 | 2016 Assistant Professor

West Virginia University

Morgantown, WV

- Authored Peer-Reviewed Publications. Published over 10 articles in high-impact journals, contributing to advancements in program evaluation, research methodologies, and applied social science.
- Developed Automated Systems for Data Collection and Analysis.

  Established automated systems to streamline data collection,
  cleaning, and analysis processes, improving efficiency and accuracy
  across multiple research projects.
- Designed and Launched Innovative Surveys. Created and implemented interactive, web-based surveys using HTML, CSS, and JavaScript on the Qualtrics platform, generating over 7,000 responses across multiple projects and studies.
- Directed and Participated in Evaluations. Contributed to 12 program evaluations, including serving as the lead evaluator on multiple federally funded grants.

- Extracted, Analyzed, and Visualized Data. Processed and visualized data from internal research and remote sources, creating over 20 interactive visualizations using RMarkdown and Shiny for academic and stakeholder dissemination.
- Mentored Graduate Students. Guided three Master's students and one PhD student through the successful completion of their research projects, advancing their professional development.
- Presented at National Academic Conferences. Delivered presentations at over 20 academic conferences, with a majority being national-level events, sharing research findings with a broad academic audience.
- Taught Research and Methods-Based Courses. Instructed over 500 students in evaluation, research methods, measurement, and survey design, focusing on practical, analytical skills in data science.

2016 | 2014 Data Analyst University of Kansas

Lawrence, KS

- Administered Tailored Evaluations. Conducted needs assessments and led participatory evaluations, particularly those focused on empowerment, for multiple non-academic units.
- Created an Evaluation Model for Academic Advising. Combined a
  Delphi study with academic advisors, mixed-methods research with
  student interviews and surveys, and survival analysis of student
  retention data to develop a comprehensive evaluation model for
  academic advising.
- Developed and Implemented Questionnaires. Developed and implemented questionnaires of about 300 university students and staff, achieving response rates from 47% to 91% across multiple studies.
- Engineered Web Applications and Dashboards. Utilized R and Tableau to streamline and automate the processes of data extraction and visualization of student-level data accessed from the university's Oracle server.
- Spearheaded Research Initiatives. Developed statistical models that identified weaknesses and gaps in student retention strategies, contributing to a 3% to 5% increase in continuance rates for specific at-risk groups.
- Studied the Impact of Student Services. Utilized qualitative, quantitative, and mixed-methods approaches to study the impact of academic advising and engagement initiatives on student persistence, progression, retention, and completion/graduation.

#### SELECT PUBLICATIONS

2024

Experiences and Perceptions of Engineering Students Towards Cross-Disciplinary Course Using Sentiment Analysis Journal of Civil Engineering Education

Dey, K., Rahman, M.T., **Roy, A.**, Pyrialakou, V.D., Martinelli, D., Fraustino, J.D., Deskins, J, Rambo-Hernandez, K.E., & Plein, L.C. https://doi.org/10.1061/JCEECD/EIENG-1976

2023

Teaching science via computational thinking? Enabling future science teachers' access to computational thinking. Contemporary Issues in Technology and Teacher Education

Kale U., Kooken, A., Yuan, J., & Roy, A. https://citejournal.org/volume-23/issue-3-23/science/teaching-science-via-computational-thinking-enabling-future-science-teachers-access-to-computational-thinking

2023

Program evaluation standards for utility facilitate stakeholder internalization of evaluative thinking in the West Virginia Clinical Translational Science Institute.

Journal of Multidisciplinary Evaluation

Curtis, R., Roy, A., Lewis, N., Dooty, E. N., & Mikalik, T. https://journals.sfu.ca/jmde/index.php/jmde\_1/article/view/831

Thinking processes in code.org: A relational analysis approach to computational thinking computer science education.

Computer Science Education

Kale, U., Yuan, J., & Roy, A. https://doi.org/10.1080/08993408.2022.2145549

There's so much to do and not enough time to do it! A case for sentiment analysis to derive meaning from open text using student reflections of engineering activities.

American Journal of Evaluation, 42 (4), 559-576.

Roy, A., & Rambo-Hernandez, K.E. https://doi.org/10.1177/1098214020962576

To design or to integrate? Instructional design versus technology integration in developing learning interventions. Education Tech Research Dev 68, 2473–2504.

Kale, U., Roy, A. & Yuan, J. https://doi.org/10.1007/s11423-020-09771-8

Using interactive theater to promote inclusive behaviors in teams for first-year engineering students: A sustainable approach.

Development of A Holistic Cross-Disciplinary Project Course Experience as a Research Platform for the Professional Formation of Engineers.

Dey, K.C., & Rahman, M.T., & Pyrialakou, V.D., & Martinelli, D., & Rambo-Hernandez, K.E., & Fraustino, J.D., & Deskins, J., & Plein, L.C., & Roy, A.R. https://peer.asee.org/29592

General chemistry student attitudes and success with use of online homework: Traditional-Responsive versus Adaptive-Responsive.

Journal of Chemical Education, 95 (5), 691-699.

Richard-Babb, M., Curtis, R., Ratcliff, B., Roy, A.R., & Mikalik, T. https://doi.org/10.1021/acs.jchemed.7b00829

To go virtual or not to go virtual, that is the question: A comparative study of face-to-face versus virtual laboratories in a physical science course.

Journal of College Science Teaching, 48 (2), 59-67.

Miller, T.A., Carver, J.S., & Roy, A.R. https://www.jstor.org/stable/26616271

Reasoning-and-proving in algebra: The case of two reform-oriented U.S. textbooks.

 ${\it International Journal of Educational Research~64., 92-106}$ 

Davis, J.D., Smith, D.O., **Roy, A.R.**, & Bilgic, Y. K. https://doi.org/10.1016/j.ijer.2013.06.012

What's in a Scriven number?

Journal of MultiDisciplinary Evaluation, 8 (19), 41-45.

Roy, A.R., Hobson, K.A., & Coryn, C.L.S. https://doi.org/10.56645/jmde.v8i19.372

### **BOOK CHAPTERS**

2014

Social network analysis: Finding meaning in connections.
 Nova Science Publishers, Inc.

Roy, A.R. 978-1-53612-734-8



### **INVITED CONTRIBUTIONS**

2012

What is a Scriven number? The American Evaluation Association Newsletter

Roy, A.R., Hobson, K.A., & Coryn, C.L.S.



### **EVALUATIONS**



#### **ACTIVE**

Current 2023

Lead Program Evaluator & Methodologist - Healthy Start Initiative (HRSA-19-049 Total Award: \$5,470,000) West Virginia University Research Corporation

Morgantown, WV

- · Conducted process, monitoring, and impact evaluations at the program level.
- Designed and validated survey tools, evaluating the experiences of more than 50 participants.
- · Generated two comprehensive internal evaluation documents and prepared an evaluation proposal aimed at federal funding renewal.
- · Utilized a mixed-methods design to independently analyze both longitudinal and cross-sectional data, focusing on the smoking cessation efforts of mothers and the experiences of new or distant caretakers/fathers.

Current 2022

Program Evaluator & Mixed Methods Analyst - Teaching Science with Computational Thinking: Preparing Preservice Elementary Educators of the Future STEM Workforce (2019-NSF 2142274 Total Award: \$294,958.00) West Virginia University

Morgantown, WV

- Administered process evaluations for all program activities.
- Created and employed a longitudinal mixed-method study to reduce and analyze more than 50 open-ended survey responses and six interview session transcripts, leveraging thematic/content analyses and techniques including HDBSCAN/t-SNE, k-Means, and PCA.
- Designed and validated two survey tools for assessing progress and evaluating programmatic impact.
- Produced one in-depth internal evaluation document and crafted evaluation summaries for federal reporting purposes.

#### **COMPLETED**

2022 2017 Community Program Evaluator & Data Scientist - WVCTSI: West Virginia Clinical and Translational Science Institute (2017-NIH 2U54GM104942-02 Total Award: \$20,000,000)

West Virginia University

Morgantown, WV

- Analyzed extensive datasets using both frequentist and Bayesian methodologies, guiding the direction and activities of eight distinct
- · Authored quarterly reports as well as internal and external annual evaluation documents, disseminated both in print and through interactive formats developed in Rmarkdown.
- Crafted over 100 data visualizations and developed over four Shiny applications for internal and public data exploration, including research collaborations using social network analysis, grant activities pulled from the NCBI API crossed with WVCTSI grant
- numbers, and dissemination of result and changes in practice within and beyond West Virginia.
- Designed and disseminated tailored Qualtrics surveys enhanced with HTML, CSS, and JavaScript, reaching an audience of over 5,000 individuals.
- · Led local and multi-site, multi-cluster evaluation studies that influenced five core medical research and community engagement
- · Mentored six aspiring graduate students in social data science, steering them through successful research endeavors.

2020 2021

Program Evaluator - Appalachian Gerontology Experiences - Advancing Diversity in Aging Research (2020-NIH 1R25AG059558-01A1 Total Award: \$678.000)

West Virginia University

Morgantown, WV

- Developed and distributed two customized interactive surveys using Qualtrics, enhanced with CSS and JavaScript, to gather feedback on programmatic activities from a specific group of 24 students.
- Spearheaded three distinct evaluative studies focusing on student efficacy, engagement, and motivation.
- Produced an external evaluation summary for federal reporting.

2020 2022 Research Methods Advisor & Specialist - Research Initiative: A Holistic Cross-Disciplinary Project Experience as a Platform to Advance the Professional Formation of Engineers (2019-NSF 1927232 Total Award: \$200,000) West Virginia University

Morgantown, WV

- Conducted longitudinal studies on the experiences of 30 undergraduate students in specialized interdisciplinary courses that integrated social science and engineering, using both surveys and focus group discussions.
- Mentored 10 engineering faculty members and graduate students in the implementation of research methodologies.

2018 2017 Program Evaluator - Stepping UP with Avenue: Progress Monitoring: A Software Suite Helping Teachers Improve Literacy Progress For Deaf/Hard Of Hearing Students (2017-ED H327S170012 Total Award: \$2,470,440)

Pennsylvania State University

State College, PA

- Administered in-depth evaluations of five tools designed for assessment and engagement of the deaf and hard of hearing.
- Conducted a multi-site, multi-cluster evaluation on a large scale for all programmatic activities.
- Produced a detailed external evaluation brief for federal reporting.

2018 2017

Lead Program Evaluator - Cultivating Inclusive Identities of Engineers and Computer Scientists: Expanding Efforts to Infuse Inclusive Excellence in Undergraduate Curricula (2017-NSF 1725880 Total Award: \$2,000,000) West Virginia University

Morgantown, WV

- Administered longitudinal surveys to over 50 participating faculty members to gauge expectations, gather feedback for improvement, and monitor shifts in DEI attitudes and perceptions.
- Applied longitudinal NLP text mining techniques such as concordance, LDA topic modeling, and sentiment analysis to analyze and summarize feedback from over 3,000 first-year engineering students concerning grant-related class activities.
- Contributed to the creation of more than 10 journal publications and academic conference presentation materials.
- Developed more than 150 static and interactive data visualizations for stakeholder exploration, both internal and external reporting, as well as for presentations and publications.
- Evaluated all four principal investigators through personnel assessments.
- Produced two in-depth internal evaluation documents and crafted summaries for external stakeholders and federal reporting purposes.

2020 2017 Program Evaluator - GAUSSI: Generating, Analyzing, and Understanding Sensory and Sequencing Information: A Trans-Disciplinary Graduate Training Program in Biosensing and Computational Biology (2017-NSF 1450032 Total Award: \$3,013,779)

Colorado State University

Fort Collins, CO

- Administered 32 interviews and focus groups, both cross-sectional and longitudinal, using unstructured and semi-structured formats to gauge the experiences of students and faculty.
- Carried out process evaluations for four grant-associated programs, leading to enhanced member tracking, increased program efficiency, and heightened participant satisfaction.
- Constructed and validated tools to measure students' ability to convey research findings to a lay audience.
- Designed semi-annual adaptive and interactive Qualtrics surveys enhanced with HTML/CSS/JavaScript, securing feedback from
- over 100 students and faculty with a 95% response rate.
- Developed predictive models targeting the improvement of student engagement, experience, and retention.
- Generated data visualizations for assessment and longitudinal studies, bolstering inferential statistical analyses to identify trends and support programmatic enhancements, retention strategies, and satisfaction initiatives.
- Produced nine in-depth internal evaluation documents and crafted summaries for external stakeholders and federal reporting purposes.

# PRESENTATIONS

2022	•	Let's get sentimental: Machine learning aided data analysis for large qualitative data sets  **American Evaluation Association Annual Conference**  * New Orleans, LA		
		Seidel, T., Ferguson, C.F., & <b>Roy, A.R.</b>		
2022	•	Best of both worlds: Affordances of mixing machine learning and qualitative content analysis  **American Educational Research Association Annual Meeting**  **San Diego, CA**		
		Roy, A.R., Ferguson, C.F., Curtis, R., & Babb-Richards, M.		
2020 • These		hese aren't random words just strung together?: Using machine learning and pretty visualizations to discover topics in		
		articles.  American Evaluation Association Annual Conference  virtual		
		Roy, A.R.		
2019	•	Little fish in a big pond, only fish in a little pond: How roles shape our identities as evaluators.  **American Evaluation Association Annual Conference**  * Minneapolis, MN		
		Loomis, D.L., Mikalik, T.L., Curtis, R., <b>Roy, A.R.</b> , & Bernstein, M.		
2019	•	Evolving program logic models to meet shifting program needs: The case of WV Clinical Translational Science Institute.  *American Evaluation Association Annual Conference*  * Minneapolis, MN		
		Curtis, R., <b>Roy, A.R.</b> , Bernstein, M, Loomis, D.L., & Mikalik, T.L.		
2019	•	The value of external evaluators when building clinical translational research infrastructure.  **American Evaluation Association Annual Conference**  * Minneapolis, MN		
		Curtis, R., <b>Roy, A.R.</b> , Bernstein, M, Loomis, D.L., & Mikalik, T.L.		
2019	•	Using associated networks to evaluate content within courses.  **American Evaluation Association Annual Conference**  Minneapolis, MN		
		Roy, A.R., Kale, U, & Yuan, J.		
2019	•	Why is it that writers write but fingers don't fing? Using machine learning and lexemes to make sense of nonsense.  **American Evaluation Association Annual Conference**  **Minneapolis, MN**		
		Roy, A.R., Curtis, R., Mikalik, T.L., Loomis, D.L., & Bernstein, M.		
2019	•	Iscovering the underlying meaning behind <i>get me off your f***ing mailing list?</i> and most other narratives.  **American Evaluation Association Annual Conference*  **Minneapolis, MN		
		Roy, A.R., Curtis, R., Mikalik, T.L., Loomis, D.L., & Bernstein, M.		
2019	•	Assessing for improvement: The use of artificial intelligence to uncover potential differential impact of assignments.  **American Evaluation Association Annual Conference**  **Toronto, CN		
		Roy, A.R. & Rambo-Hernandez, K.		

2018		That's a pretty picture of dots and lines but what does it mean?: A Q&A session with the Social Network Analysis TIG leaders.
		American Evaluation Association Annual Conference  © Cleveland, OH
		Roy, A.R., Durland, M.M., Woodland, R., & Phillips, G.
2018	•	Navigating buy-in and shifting evaluation needs over time in NIG Clinical Translational Research Award.  **American Evaluation Association Annual Conference**  Cleveland, OH
		Curtis, R., <b>Roy, A.R.</b> , & Mikalik, T.L.
2018		Using a mixed methods evaluation to discover how an interactive theater based model stimulates inclusive behaviors in engineering.  **American Evaluation Association Annual Conference**  **Cleveland, OH**
		Roy, A.R., Rambo-Hernandez, K., Hensel, R.A., & Morris, M.L.
2018	•	Collaboration evaluation: Using social network analysis to reveal an active undiscovered network.  **American Evaluation Association Annual Conference**  Cleveland, OH
		Roy, A.R., Curtis, R., & Mikalik, T.L.
2018	•	Examining the past and looking forward: The future of evaluation theory and use.  *American Evaluation Association Annual Conference*  Cleveland, OH
		Roy, A.R. & Hobson, K.A.
2017	•	Transforming graduate STEM Education: A theory-driven evaluation of the GAUSSI National Science Foundation Research Training (NRT) Program.
		American Evaluation Association Annual Conference  Washington, DC  Park A.R. Harnandez, D.A. Chap, T. & Parking C.
		Roy, A.R., Hernandez, P.A., Chen, T., & Paguyo, C.
2017		Program evaluation for everyone! - Constructing an online foundational course for capacity building using theorists as a focus.
		American Evaluation Association Annual Conference  Washington, DC
		Roy, A.R. & Curtis, R.P.
2017	•	Three stages down! Exploring the criteria for the next generation of evaluation theorists through social network analysis.  *Hawaii-Pacific Evaluation Association Annual Conference**  **Grand Confer
		Roy, A.R. & Hobson, K.A.
2017	•	Content in the background: Using evaluation theorists as the principal motivator for foundational evaluation courses.  Hawaii-Pacific Evaluation Association Annual Conference  Kane'ohe, HI
		Roy, A.R. & Curtis, R.P.
2015	•	Survey says! Students getting tired of surveys.  National Academic Advising Association Annual Conference  Las Vegas, NV
		Roy, A.R. & Goetz, H.L.

2013		Influences of Hierarchical Linear Modeling in evaluation.  Aotearoa New Zealand Evaluation Association Annual Conference	• Auckland, NZ
		Hobson, K.A., Roy, A.R. & Coryn, C.L.S.	
2012	•	Survey sample methods: Evaluators' toolbox refreshment.  American Evaluation Association Annual Conference	Minneapolis, MN
	I	Hobson, K.A., Roy, A.R. & Coryn, C.L.S.	
		TEACHING EXPERIENCE	
		EVALUATION, MEASUREMENT, AND RESEARCH METHODS (2016 - 2023)	
2020	•	Data Visualization	
 2018		West Virginia University	Morgantown, WV
		2020, 2018	
2017		Educational Psychology West Virginia University	• Morgantown, WV
2016	•	Educational Research	_
		West Virginia University	Morgantown, WV
2022	•	Introduction to Research	• • • • • • • • • • • • • • • • • • • •
2016		West Virginia University	Morgantown, WV
		2022, 2018, 2017, 2016	
2020	•	Measurement/Evaluation in Educational Psychology	Morgantown, WV
2018		West Virginia University 2022, 2020, 2018	▼ Morgantown, wv
		2022, 2020, 2010	
2019	•	Mixing Research Methodologies	<b>A</b> Marrantania M0/
2017		West Virginia University	• Morgantown, WV
		2022, 2019, 2018, 2017	
2023	•	Program Evaluation	• • • • • • • • • • • • • • • • • • • •
1 2017		West Virginia University	Morgantown, WV
		2023, 2022, 2021, 2020, 2019, 2018, 2017	
2021	•	Social Network Analysis	<b>A</b> W
2017		West Virginia University	• Morgantown, WV
		2021, 2017	
2021		Statistical Methods 1	<b>A</b> 11
1 2017		West Virginia University	Morgantown, WV
		2021, 2020, 2019, 2018, 2017	

2022   2020		Survey Research West Virginia University 2022, 2020	• Morgantown, WV
	$\infty$	MATHEMATICS (2005 - 2015)	
2008		Business Calculus Central Michigan University	• Mount Pleasant, MI
2009		College Algebra Central Michigan University	• Mount Pleasant, MI
2012		Discrete Mathematics Central Michigan University	• Pittsburgh, KS
2014	•	Elementary Statistics Central Michigan University	• Pittsburgh, KS
2010   2009	•	Foundations of Statistics Central Michigan University 2009, 2010	Pittsburgh, KS
2008   2007	•	Intermediate Algebra Central Michigan University 2007, 2008	• Mount Pleasant, MI
2007	•	Integral Calculus Michigan Technological University	• Houghton, MI
2015   2014	•	Linear Algebra University of Kansas 2014, 2015	<b>♦</b> Lawrence, KS
2013	•	Mathematical Thinking Grades 6-12 Western Michigan University	<b>♥</b> Kalamazoo, MI
2014   2013		Mathematics Curriculum Grades 6-12 Western Michigan University 2013, 2014	<b>♥</b> Kalamazoo, MI
2005		Multivariable Calculus Michigan Technological University	Houghton, MI
2007   2006		Single Variable Calculus Michigan Technological University 2006, 2007	• Houghton, MI

# ¶ SERVICE

2022 | 2013 Associate Editor

Journal of MultiDisciplinary Evaluation

# **MEMBERSHIPS**

2022 | 2012 American Evaluation Association