

Aaron Wenger

PH.D CANDIDATE

Kalamazoo, Michigan

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I am a Ph.D. candidate in the Mallinson Institute of Science Education, currently preparing my dissertation manuscript. Example work can be found on my Github page in the 'Portfolio' repository. Several hyperlinks to relevant projects are embedded.

Professional Profile

RESEARCH INTERESTS

- 1) Meta-research methods, especially meta-analysis and bibliometrics
- 2) Computational reproducibility and open science practices
- 3) Role of evidence in educational policy and practice

TEACHING AND PUBLIC ENGAGEMENT INTERESTS

- 1) Scientific methods, experimental design, causal inference, and philosophy of science
- 2) Introductory and advanced biology subjects, particularly microbiology and molecular biology
- 3) History of educational psychology and science education
- 4) Statistical and computational research methods using R, especially computational reproducibility

Western Michigan University

Kalamazoo, Michigan

PH.D. CANDIDATE IN SCIENCE EDUCATION

2017-present

- Currently writing dissertation manuscript; advised and chaired by Dr. William Cobern (concurrently enrolled in Biology MA program until 2021)
- Named the **2023-2024 Department Graduate Research and Creative Scholar**, in recognition of excellence in research and creative scholarship
- Coursework relevant to position includes:
 - 1) Experimental and Quasi-experimental Design for Applied Research and Evaluation
 - 2) Fundamentals of Measurement in the Behavioral Sciences
 - 3) Survey Research
 - 4) Applied Multivariate Statistics

PROJECTS/MANUSCRIPTS IN PROGRESS (WORKING TITLES)

- Dissertation: Beyond Average Effects in Education Research: *Explaining heterogeneity of concept mapping research in science education through meta-regression modeling*
 - Article 1:** Challenges and Solutions for Knowledge Accumulation in Science Education Research
 - Article 2:** Concept Mapping in Biology Education: *A Systematic Review and Meta-Analysis*
 - Article 3:** Explaining Heterogeneity in Science Education Research: *Comparing machine learning models with a priori meta-regression models*
- Mapping the Homeschooling Literature: *A Scoping Review and Source Analysis*

GRADUATE RESEARCH ASSISTANT IN SCIENCE AND MATHEMATICS PROGRAM IMPROVEMENT (SAMPI)

2021-2023

- Assisted in program evaluation for clients including NSF-funded Professional development for Emerging Education Researchers (PEER) field school, Kalamazoo Scholars Program, and the Michigan STEM Network (MiSTEM)
- Created protocols and evaluation tools (e.g., Qualtric surveys and interview questions)
- Conducted quantitative and qualitative analysis of numerical, ordinal, and textual data
- Wrote internal and external reports summarizing findings

Education

Western Michigan University

Kalamazoo, Michigan

M.A. IN BIOLOGICAL SCIENCES

2017-2021

- Master's Thesis Project: Engineered Flagellin Disulfide Variants in *Salmonella typhimurium*. Advised by Dr. Brian Tripp

Cornerstone University

Grand Rapids, Michigan

B.S. IN BIOLOGY-HEALTH SCIENCES - MINORS IN CHEMISTRY, ANCIENT (HISTORY) STUDIES

2011-2015

- Recipient of the Ronald Meyer Academic Scholar, Dean's list (6 of 7 semesters), and President's Scholarship
- Senior Thesis Project: a meta-study of the neural crest as a mechanism for vertebrate phenotypic diversity
- Internship: Hesse Memorial Archaeological Laboratory, learned and applied zooarcheological techniques with animal bone remains

Portfolio and Further Education

SOFTWARE FOR STATISTICS AND DATA SCIENCE

R: substantial programming experience with base R, the Rstudio IDE, and common packages such as 'ggplot' (See *ConceptMapping-inBioEd*)

Git and GitHub: substantial experience creating and mangaging projects using Git version control and the GitHub collaboration platform (See my GitHub account for several public projects)

Analysis Pipeline Tools: substantial experience implementing data analysis pipelines with the 'targets' and 'renv' R packages (See *ConceptMapping-inBioEd*)

SPSS and SAS: minor programming experience with both (See *Portfolio/sas*)

Excel VBA: minor programming experience (See *Portfolio/vba*)

SOFTWARE FOR DOCUMENTATION AND REPORTING

Microsoft Office Suite: extensive experience with Word, PowerPoint, Excel, Outlook, and Teams ()

Quarto: substantial experience creating reports and presentations ()

Rmarkdown: substantial experience creating data analysis notebooks, reports, and other documents such as this CV ()

LaTeX: minor working experience using the TeXworks IDE such as in this CV ()

OTHER SOFTWARE

Qualtrics: substantial experience in creating survey forms, distributing to program participants, and processing results

Google Forms: substantial experience in creating survey forms and processing results

Abstrackr and MetaReviewer: substantial experience in these platforms for meta-research studies

WORKSHOPS AND ONLINE COURSES

- 2023 **Instats: Confirmatory factor analysis and structural equation modeling in R:** Taught by Michael Zyphur and with certificate of completion
- 2023 **Instats: Meta-analytic structural equation modeling:** Taught by Mike Cheung and with certificate of completion
- 2023 **Evidence Synthesis and Meta-Analysis in R (ESMAR) Conference:** several workshops including: Advanced GitHub, Screening studies for eligibility in evidence syntheses
- 2022 **Excel VBA Programming:** video course introducing VBA programming and various applications such as macro implementation, userforms, and webscraping
- 2022 **Research Transparency Online Course:** put on by the Berkeley Initiative for Transparency in the Social Sciences (BITSS)
- 2022 **Reproducible Research Tutorial Series:** online course by Dr. Schloss of the University of Michigan, supported by NIH
- 2022 **Instats: Path analysis with interactions and indirect effects in R:** Taught by Michael Zyphur
- 2021 **Bibliometrics Training Series:** put on by the NIH Library
- AERA-ICPSR PEERS:** attended several in this workshop series including: Modern Meta-analysis,
- 2020-21 Cutting-edge Quatitative and Computational Methods for STEM Education, and Introduction to qualitative meta-synthesis methods
- 2020 **Introduction to Systematic Reivew and Meta-Analysis:** a John Hopkins University course hosted by Coursera

Teaching Experience

LECTURER FOR PRE-MED INTIATIVE

- A student-led program for MCAT exam preparation

2018

Western Michigan University

Kalamazoo, Michigan

TEACHING ASSISTANT

2017-2021

- Served as instructor of record, teaching science courses for primary education majors
- CHEM 2800 - Physical Science for Elementary Educators: a inquiry-based, activity-centered course covering basic chemical and physical science principles
- BIOS 1700 - Life Science for Non-Majors: a laboratory-lecture-based content course covering major topics in the life sciences; taught first as an in-person course then **independently adapted to a virtual, partially synchronous implementation** for 2020-21 fall/spring semesters
- GEOG 1900 - Exploring Earth Science, the Atmosphere: A laboratory-based course covering basic earth science principles with an emphasis on the atmosphere; taught as a virtual, partially synchronous course

Friday Addition (FA) and Homeschool Ancillary Program (HsAP)

Michigan

TEACHER

2015-2017

- Developed and taught 9th grade biology and 7th grade general science classes at FA and HsAP as well as 10th grade chemistry at HsAP

Cornerstone University

Grand Rapids, Michigan

COLLEGE TUTOR AND LABORATORY ASSISTANT

2012-2015

- Tutored college undergraduates for courses in genetics, chemistry, physics, math, and history with 480 hours of experience
- Assisted in stockroom, ordering materials, organizing activities, and grading laboratory reports

Grants and Professional Experience/Service

2019	Graduate Student Research Grant Institutional grant secured for biology master thesis project	Western Michigan University
2021	Graduate Student Research Grant Secured for Science Education Research Project	Western Michigan University
	Graduate Student Panel Reviewer	
2024	Served as graduate student reviewer for Division D (Measurement & Research Methodologies) and SIG-SRMA (Systematic Review and Meta-Analysis special interest group)	AERA Annual Meeting

Presentations and Publications

1. Wenger, A., & Cobern, W. (2023). *Replication of concept mapping research in biology education: A systematic review and meta-analysis*. [Conference]. Michigan Academy of Science Arts and Letters Annual Conference, Berrien Springs, Michigan. <https://ace-wenger.quarto.pub/masal23-concept-mapping/>
2. Williams, C., & Wenger, A. (2023). *Evaluating the effects of field schools on emerging STEM education researchers*. [Conference]. Michigan Academy of Science Arts and Letters Annual Conference, Berrien Springs, Michigan.