Mike Ion

610 E University Ave
Ann Arbor, MI 48109
✉ mikeion@umich.edu
🖥 www.mikeion.com

Education

2017–Present (In progress) **Ph.D.**, *Mathematics Education*, University of Michigan.
Advisor: Pat Herbst

2013-2015 **M.S.**, *Mathematics*, Cal Poly.
Advisor: Ben Richert

2009-2013 **B.S.**, *Mathematics*, Cal Poly.

Research Interests

I am interested in understanding mathematics teachers' knowledge through their use of language as they reason through various decision points within instructional situations. Methodologically, this involves using machine learning/natural language processing to train models to analyze their responses. I aspire to specialize as a methodologist working on interdisciplinary projects.

Research Experience

Sept. 2017 - Present **Graduate Student Research Associate - Geometry, Reasoning, and Instructional Practices (GRIP) Lab**, University of Michigan, Supervisor: Pat Herbst.

I primarily serve as a research assistant working on an NSF Grant studying the undergraduate geometry course (NSF Award Number: 1725837). Some responsibilities include:

- Conducting item-response theory (IRT) analysis of results from mathematical knowledge for teaching (MKT) assessments, and distribute reports to instructors.
- Coding qualitative data (e.g., interview data, survey responses) manually and with machine learning models)
- Organizing working groups for an online professional development network of university geometry instructors.
- Writing conference papers and presenting research at national conferences.

Apr. 2020 - Present **Graduate Student Research Associate - College and Beyond II Project (Mellon Grant)**, University of Michigan, Supervisor: Anne Gere.

I am responsible for running statistical analyses and providing insight to a research team studying the effects of a liberal arts education on life outcomes. Some responsibilities include:

- Working on a team to analyze results from a pilot survey to determine next steps forward.
- Providing readability statistics on a set of essay responses.
- Connecting responses on a pilot survey using structural equation modeling.

May 2019 - Dec. 2019 **Graduate Student Research Apprentice - Wolverine Pathways Curriculum Development Project**, University of Michigan, Supervisor: Maisie Gholson.

Responsibilities included:

- Working on a team to develop social-justice oriented curriculum materials for a summer mathematics program.
- Facilitating a professional development workshop for Wolverine Pathways teachers.
- Advising team members on survey methodologies.

Invited Talks and Conference Papers

Jan. 2019   **State of Undergraduate Geometry Courses for Secondary Teachers: Curriculum, Instructional Practices, and Student Achievement**, Joint Mathematics Meeting. Denver, CO.
Herbst, P., Stevens, I., Milewski, A., **Ion, M.**, Ko, I.

Nov. 2019   **What Do We Mean by Equity: A Topic Modeling Approach**, Education in Mathematics, Science, and Technology Research Interdisciplinary Workshop. Ann Arbor, MI.
Ion, M., Robinson, D.

Nov. 2019   **Developing Practical Measures To Support the Improvement of Geometry for Teachers Courses**, Psychology of Mathematics Education, North America Annual Conference. St. Louis, MO.
Ion, M., Herbst, P., Margolis, C., Milewski, A., Ko, I.

Apr. 2019   **Tensions in Teaching Mathematics to Future Teachers: Understanding the Practice of Undergraduate Mathematics Instructors**, American Education Research Association Conference. Toronto, Canada.
Milewski, A., **Ion, M.**, Herbst, P., Shultz, M., Ko, I., Bleecker, H.

Mar. 2019   **Sources of Justification for College Geometry Instructional Actions**, Graduate Student Community Organization Graduate Student Conference. Ann Arbor, MI.
Ion, M., Margolis, C.

Feb. 2019   **Preparing Teachers for Secondary Geometry: Understanding the Tensions in Teaching Undergraduate Mathematics Courses for Future Teachers**, Association of Mathematics Teacher Educators Annual Conference. Orlando, FL.
Milewski, A., Herbst, P., **Ion, M.**, Bleecker, H.

Oct. 2018   **Learning About the Norms of Teaching Practice: How Can Machine Learning Help Analyze Teachers' Reactions to Scenarios?**, Michigan Institute for Data Science Annual Symposium. Ann Arbor, MI.
Ion, M., Bardelli, E., Herbst, P.
Awarded 'Most Likely Scientific Impact'

Oct. 2018   **What Influences Do Instructors of the Geometry for Teachers Course Need to Contend With?**, Psychology of Mathematics Education, North America. Greenville, SC.
Herbst, P., Milewski, A., **Ion, M.**, Bleecker, H.

Mar. 2018   **Characterizing University Geometry Courses: An Interview-Based Approach**, Graduate Student Community Organization Graduate Student Conference Ann Arbor, MI.
Ion, M.

Teaching Experience

Sept. 2018 - Present   **Graduate Student Instructor**.
University of Michigan. Ann Arbor, MI.
I serve as a teaching assistant for the graduate-level Introduction to Quantitative Methods course (EDUC 793) provided in the School of Education. Responsibilities include:
- Delivering weekly lab instruction to 20 students on supplementing their statistics learning through the use of Stata software.
- Attending lecture and providing instructional support to students.
- Grading homework, exams, and final papers.

Jul. 2019 &	**Instructor for John Hopkins University CTY Summer Program**.
Jul. 2018	Hong Kong University. Hong Kong, S.A.R. & Seattle University. Seattle, WA.
	Primary instructor for course titled *Paradoxes and Infinities* during the summers of 2018 and 2019.
	These courses had around 20 students from around the world. Responsibilities included:

- Developing curriculum for 100+ contact hours in the classroom.
- Writing written evaluations for all students
- Supervising the work of a teaching assistant.

Jan. 2017 -	**Lecturer - Mathematics Department**.
Jul. 2017	Cal Poly. San Luis Obispo, CA.
	Served as instructor of record for the following courses:

- Precalculus (Math 118)
- Trigonometry (Math 119)
- Calculus for Business and Economics (Math 221)
- Calculus for the Life Sciences (Math 161)

Sept. 2013 -	**Graduate Teaching Associate (Instructor of Record)**.
Jun. 2015	Cal Poly. San Luis Obispo, CA.
	Served as instructor of record for the following courses:

- Precalculus (Math 116, Math 118)
- Calculus for Business and Economics (Math 221)

Sept. 2011 -	**Calculus Workshop Facilitator**.
Jun. 2013	Cal Poly. San Luis Obispo, CA.
	Workshop coordinator for Calculus I, II, and III courses. Responsiblities included:

- Attending the content course
- Preparing worksheets, mock quizzes and exams, and games
- One-on-one meetings with students
- Meeting weekly with course instructor and Math Program Staff
- Running a workshop with 10-25 students, assisting and guiding them through the content.

Jun. 2011 -	**Residential Counselor/Teaching Assistant for EPGY Summer Institutes**.
Aug. 2012	Stanford University. Palo Alto, CA.
	A full-time residential position during the summers of 2011 and 2012. I provided educational support for mathematics courses for gifted middle school students.

Awards

Sept. 2017- Present	**School of Education Scholar Award**. University of Michigan
April 2019	**Educational Studies Summer Grant**. University of Michigan
October 2018	**Most Likely Scientific Impact**. University of Michigan Data Science Symposium
June 2015	**Outstanding Teaching Associate Award**. Cal Poly

Professional Development

Nov. 2019	**Deep Learning Workshop**, *led by Google*.
Jun. 2018	**Introduction to Deep Neural Networks with Keras/Tensorflow Workshop**, *led by Greg Teichert*.

May. 2018	**Big Data Camp**, *led by Interdisciplinary Committee on Organizational Studies at University of Michigan*. Worked with a team of grad students on a big data project looking at success rates of NSF grants based on language use. Code can be found at: https://github.com/mikeion/NSF-Awards-Project
Mar. 2018	**An Introduction to Machine Learning for Social Scientists Workshop**, *led by Jake Hofman from Microsoft Research*.

Skills

Computing	Python (advanced), Stata (intermediate), M-Plus (intermediate), Git (intermediate), R (beginner)
Human Languages	English, Spanish (intermediate), Farsi (beginner), Setswana (beginner)
Specialties	Natural Language Processing, Statistics, Psychometrics, Structural Equation Modeling

(Recent) Relevant Coursework

University of Michigan	Natural Language Processing: Algorithms and People (SI 630); Systemic Functional Linguistics (EDUC 737); Introduction to Quantitative Methods (EDUC 793); Quantitative Methods for Non-Experimental Research (EDUC 795); Psychometrics (EDUC 707); Structural Equation Modeling (EDUC 803)
Datacamp.com	Introduction to Python; Intermediate Python; Python Data Science Toolbox (Part 1 and Part 2); Supervised Learning with Sklearn; Introduction to Importing Data with Python; Intermediate Importing Data with Python; Introduction to Natural Language Processing in Python

Service

Jun. 2015 - May 2016	**Peace Corps Volunteer**, *Botswana*. ○ Served as a mentor for an HIV-awareness youth group and a chess club. ○ Acted as a health promoter while training young people to serve as peer educators, enabling them to provide HIV/AIDS education and awareness to other youth and adults in their communities. ○ Inside and outside the classroom work developing a math curriculum at a low-income junior secondary school. ○ Advanced-Mid proficiency on the Language Proficiency Interview in the local language (Setswana)
Dec. 2014	**Alternatives to Violence Project**, *California Men's Colony*. ○ Served as a volunteer for a two-day workshop aimed at providing inmates advice on understanding why conflict happens and strategies for communicating in difficult situations.