

# Sofia Pozsonyiova

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## Education

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**Macalester College**, St. Paul, MN

Bachelor of Arts May 2020

*Major:* Applied Mathematics and Statistics

*Concentration:* Community and Global Health

## Research Experience

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**Mayo Clinic**

Rochester, MN

*Computational Genomics, Statistical Program Analyst I*

September 2020 - Current

- Write programs for genome-wide association studies focusing on alcohol use disorder using SAS and R programming languages that will be presented to clinicians for immediate use and subsequently for manuscripts
- Create visualizations and figures using R software that will be used for upcoming manuscripts
- Prepare genetic datasets by performing quality control and genotype imputations to align with project goals

**South Dakota School of Mines & Technology**

Remote

*Research Statistician*

August 2018 – Current

- Develop machine learning and statistical methods to geographically identify ore samples to ensure that quality standards are met
- Train undergraduate and graduate students in the LIBS laboratory on statistical methods and software
- Build R packages geared to better handle complex LIBS data as well as simplify the visualization and analysis process

**Arundel Metrics**

St. Paul, MN

*Undergraduate Health Data Intern*

August 2019 - January 2020

- Analyzed, interpreted and visualized complex health, economic and social data using R software; data was then used in the compilation of America's Health Rankings 2019 Annual Report and ultimately will help to improve the health and well-being of communities
- Translated complex statistical and medical information to be shared to a non-technical audience for use in public health policy development

**Mercer Consulting**

Minneapolis, MN

*Government Health Analyst Intern*

June 2019 - August 2019

- Evaluated quality and access to Pennsylvania's Behavioral Health Services by assessing the state's fiscal and calendar-year Medicaid budget which set standards for the state's 2020 Medicaid budget
- Validated large state healthcare data sets using Microsoft Excel and SQL database management software
- Analyzed Philadelphia's Children's Crisis Services which led the state government to make a significant change in fund allocation

**Frost Science Museum**

Miami, FL

*Statistician & Data Analyst, Carcinogen Program*

November 2018 - May 2019

- Led the statistical and data analysis for the Inventors in Residence Carcinogen Research Team to help detect environmental carcinogens
- Designed new methods to efficiently classify complex emission spectra data using hierarchical clustering methods
- Developed coding procedures and data protocols, as well as prepared reports and presentations which were later presented at the SciX Conference

**The Institute for Nano Biology and Structural Biology**

Nové Hrad, Czech Republic

*Research Assistant/Fellow*

June 2018 - August 2018

- Performed computational modeling and in-lab gene expression to provide a better structural understanding of the PAPSS2(b) DNA mutation; sent to other laboratories for the development of specialized medicine
- Developed and documented a laboratory experiment protocol to aid future students

- Collaborated in the development of portable LIBS laser systems to aid in near-real-time detection of carcinogens with the goal of improving health through limiting toxic exposures
- Conducted literature reviews, collected data, and summarized results which led to a new study on the multivariate analysis of complex samples using atomic and molecular emission spectra

## Teaching Experience

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### Teacher Assistant

Spring 2020 Semester: Math 155 Introduction to Statistical Modeling (Two Sections)

Spring 2019 Semester: Math 253 Statistical Modeling and Machine Learning (Two Sections)

Fall 2019 Semester: Math 253 Statistical Modeling and Machine Learning (Two Sections)

Spring 2018 Semester: INTL 282 Introduction to International Public Health (One Section)

- Held regular office hours and private sessions to provide students with academic and software support
- Graded assignments, quizzes, and exams, and used the technology-based tracking and assessment platform of Moodle

## Publications

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### In Preparation

1. **Pozsonyiova S.**, Diwakar P.K, Fernandez M., Orme E., Classification of Ore Samples through the Application of Machine Learning Models to LIBS Spectra Data.
2. Gross J., Orme E., Carter A., Silverstein R., Ochatt C., **Pozsonyiova S.**, Felipe L., Diwakar P.K., Machine Learning for Metal Identification in Water Samples using Laser-Induced Breakdown Spectroscopy (LIBS).
3. Fernandez M., Orme E., Wagner S., **Pozsonyiova S.**, Manzano N., Caplow T., Diwakar P.K., Analysis of the Effects of Various Gas Additions to Emission Spectra Using Laser-Induced Breakdown Spectroscopy.
4. Diwakar P.K., Bheemasetti T., **Pozsonyiova S.**, Fernandez M., Orme E., Pradhan R., Diaz D., Hahn D., Lee S., Application of Advanced Machine Learning Classification Techniques to Analyze Complex LIBS Spectra.
5. **Pozsonyiova S.**, Diwakar P.K, Fernandez M., Orme E., Bridging the Gap: Integrating Statistical Modeling and Machine Learning Methods to Better Classify and Visualize LIBS Spectra Data.

### Other

6. United Health Foundation., America's Health Rankings 2019 Annual Report: A Call to Action for Individuals and Their Communities.

## Presentations

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### Presentation(s)

Diwakar P.K., **Pozsonyiova S.**, Pradhan R., Kessinger S., Leckband C., Chen K., Kellar J., Diaz D., Han D. (October 2020), LIBS and Raman Spectroscopy Integration with Advanced Machine Learning Methods to Analyze Complex Samples. Invited presentation at SciX conference 2020, Remote.

**Pozsonyiova S.**, Rafferty Q., Adams F. (February 2020), A Spatial and Longitudinal Look at Parent Adolescent Relationships and E-Cigarette Usage in Minnesota. Contributed presentation at Macalester College's Senior Capstone Day 2020, St. Paul, MN.

Diwakar P.K., Bheemasetti T., **Pozsonyiova S.**, Fernandez M., Orme E., Pradhan R., Diaz D., Hahn D., Lee S. (October 2019), Application of Advanced Machine Learning Classification Techniques to Analyze Complex LIBS Spectra. Invited presentation at SciX Conference 2019, Palm Springs, CA.

### Poster(s)

**Pozsonyiova S.**, Diwakar P.K. (October 2020), Investigating Complex LIBS Samples Through the Integration of Raman Spectroscopy and Advanced Machine Learning Methods. Contributed poster at SciX Conference 2020, Remote.

Miller N., **Pozsonyiova S.**, Diaz D., Lee S., Diwakar P.K. (October 2020), Use of Machine Learning to Further the Scope of LIBS. Contributed poster at SciX Conference 2020, Remote.

Kessinger S., Diwakar P.K., **Pozsonyiova S.**, Leckband C., Kellar J., Kamtung C. (October 2020), Geological Fingerprinting of Columbite-Tantalite. Contributed poster at SciX Conference 2020, Remote.

**Pozsonyiova S.**, Diwakar P.K., Fernandez M., Orme E. (October 2019), Bridging the Gap: Integrating Statistical Modeling and Machine Learning Methods to Better Classify and Visualize LIBS Spectra Data. Contributed poster at SciX Conference 2019, Palm Springs, CA.

Gross J., Orme E., Fernandez M., Carter A., Silverstein R., Ochatt C., **Pozsonyiova S.**, Felipe L., Diwakar P.K. (October 2019), Machine Learning for Metal Identification in Water Samples Using Laser-Induced Breakdown Spectroscopy. Contributed poster at SciX Conference 2019, Palm Springs, CA.

## Skills

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### Technical

R (Advanced), SAS (Advanced), Python3, SQL, Shiny, Git, LaTeX, HTML, Microsoft Office Packages

### Language

English (Fluent), Slovak (Fluent), Czech (Working Proficiency)

## Recognitions

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**Undergraduate Student Award**, Society of Applied Spectroscopy August 2020  
Recognition for successful application of statistics, machine learning, and visualization to complex LIBS data

**FACSS Student Poster Award**, Federation of Analytical Chemistry and Spectroscopy Society October 2019  
Bridging the Gap: Integrating Statistical Modeling and Machine Learning Methods to Better Classify and Visualize LIBS Data

**Taylor Hill Public Health Fellowship**, Academy of Sciences June 2018  
Granted fellowship to conduct 10 weeks of independent public health research at the Center for Nanobiology and Structural Biology in Nove Hradky, Czech Republic

## On-Campus Leadership & Service

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**Macalester Dance Marathon (MacPACT)**, *President*, St. Paul, MN September 2019 - May 2020  
Oversaw the complete operation of the organization to ensure the direction of the organization is in line with its mission

**Macalester Dance Marathon (MacPACT)**, *Event Chair*, St. Paul, MN September 2017 - September 2019  
Coordinated and created fundraising events which helped raise over \$15,000 for Gillette Children's Specialty Hospital located in Saint Paul, Minnesota

**First Generation to College Network**, St. Paul, MN September 2018 - May 2020  
Supported in the establishment of a first-generation college program to help mentor, support, and empower first generation students throughout their college career

**Varsity Swim Team**, St. Paul, MN September 2016 - May 2017

## Community Leadership & Service

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**Women in Machine Learning & Data Science**, Minneapolis, MN July 2019 - May 2020  
Helped create opportunities for females to engage in technical and professional conversations in a supportive environment

**RLadies**, Minneapolis, MN February 2019 - May 2020  
Member of the Minnesota charter; aided in the facilitation of R data knowledge sharing

**Minnesota Science and Business Association**, Minneapolis, MN January 2017 - January 2018  
Representative for Macalester College