DANIELLE JENSEN

Assistant Professor • Gonzaga University • jensend@gonzaga.edu

EDUCATION

Ph.D. Mathematics, Montana State University — May 2019
Dissertation: *A mathematical model of a biphasic DNA amplification reaction*
Advisor: Dr. Tomáš Gedeon

M.S. Mathematics, Montana State University — May 2015

B.S. Mathematics Teaching, Purdue University Calumet — August 2007

B.A. Mass Communication, Purdue University — May 2004

TEACHING EXPERIENCE

Montana State University, Bozeman MT — Fall 2013 - Spring 2017
Graduate Teaching Assistant *(instructor of record)*
- Single & multivariable calculus
- Differential equations
- Linear algebra

Portage Township Schools, Portage IN — Fall 2012 - Spring 2013
- Willowcreek Middle School, Algebra I & 8^{th} grade math

Lake Ridge Schools, Gary IN — Fall 2011 - Spring 2012
- Lake Ridge High School, Algebra I & II

Chicago Public Schools, Chicago IL — Fall 2007 - Spring 2011
- Paul Robeson High School, Algebra I & II
- John Hancock High School, Geometry

PUBLICATIONS AND PROCEEDINGS

Ciesielski D, Li Y, Hu S, King E, Corbey J, Stinis P. (2025) *Deep operator network surrogate for phase-field modeling of metal grain frowth during solidification.* Comput. Mat. Sci., https://doi.org/10.1016/j.commatsci.2024.113417

Nguyen J, Overstreet R, King E, **Ciesielski D**. (2024) *Advancing the prediction of MS/MS spectra using machine learning.* J. Am. Soc. Mass Spectrom., https://doi.org/10.1021/jasms.4c00154

Overstreet R, King E, Clopton G, Nguyen J, **Ciesielski D**. (2024) *QC-GN^{2}oMS^2: a graph neural net for high resolution mass spectra prediction.* J. Chem. Inf. Model., 64(15), 5806-5816. http://doi.org/10.1021/acs.jcim.4c00446

Brown DL, **Ciesielski D**, Chand, D. (2023) *Decision support systems for critical space infrastructure assets.* AEther: A Journal of Strategic Airpower & Spacepower, 2(Special Edition, Winter), https://www.jstor.org/stable/48751

King E, Overstreet R, Nguyen, J, **Ciesielski D**. (2022) *Augmentation of MS/MS libraries with spectral interpolation for improved identification.* J. Chem. Inf. Model., 62(16), 3724-3733. http://doi.org/10.1021/acs.jcim.2c00620

Wenskovitch J, Anderson A, Kincic S [et al, including **Ciesielski, D**] (2022) 'Operator insights and usability evaluation of machine learning assistance for power grid contingency analysis.' *AHFE International Conference: AHFE Open Access, vol 54.* http://doi.org/10.54941/ahfe1002219

Ciesielski D, McCalla S, Gedeon T. (2020) *Analysis of dynamics of a biphasic isothermal DNA amplification reaction.* SIAM J. Appl. Math., 80(5), 2071-2097. https://doi.org/10.1137/19M1268434

Özay B, **Ciesielski D**, McCalla S, Gedeon T (2019), 'A mathematical model to reproduce biphasic DNA amplification output', *AIChE Annual Meeting, Orlando, Florida, 13 November.*

Benson J, Bernoff A, Volkening A [et al, including **Ciesielski, D**] (2019), 'A social force agent based model for pedestrian dynamics', *Joint Mathematical Meetings AMS Special Session, Baltimore, Maryland, 17 January.*

Ciesielski D, Özay B, McCalla S, Gedeon T. (2109) *A mathematical model for a biphasic DNA amplification reaction.* J. R. Soc. Interface, 16(154):20190143. https://doi.org/10.1098/rsif.2019.0143

PRESENTATIONS AND WORKSHOPS

ACS Spring 2024 Spring 2024
- **Symposium:** Progress in Mass Spectrometry: Unambiguous Identification for Small Molecules
- Oral presentation, 'Targeted prediction of MS/MSspectra'

Data Science Seminar (Montana State University) Spring 2024
- Oral presentation, 'Dimension Reduction for Mass Spectrometry'

m/q Seminar Series (PNNL) Fall 2022
- Oral presentation, 'Increasing the versatility of MS/MS reference libraries with machine learning'

Mathematics of Machine Learning *(course)* Spring 2018
- Paper and oral presentation, 'Identifying Coal Stock Trends Using a Hidden Markov Model'

AMS MRC Agent-based Modeling in Biological and Social Systems Summer 2018
- Oral presentation, 'A social force agent based model for pedestrian dynamics'

Optimization *(course)* Fall 2017
- Paper and oral presentation, 'Primal-Dual Methods for Inverse Imaging Problems'

AARMS-PIMS Summer School in Differential Equations and Numerical Analysis Summer 2015
- Waves and patterns in nonlinear systems *(course)*
- Numerical analysis of singularly perturbed ODEs and PDEs *(course)*

RESEARCH EXPERIENCE

Pacific Northwest National Laboratory Richland, WA
Data Scientist August 2020 - October 2025
- Adapting a nonlinear optimization model to simulate evolving scenarios impacting the global food supply
  - **Theory:** Model Predictive Control, social welfare optimization, Mathematical Programming with Equilibrium Constraints, automated calibration, periodic optimization, rolling time horizons
  - **Tools:** Python *(pyomo)*
- Adapting a DeepONet to predict PDE solution evolution in material sciences domain
  - **Theory:** Neural networks for nonlinear operators, optimizing for small training data sets
  - **Tools:** Python *(jax, pyTorch, numpy, matplotlib)*, high performance computing, parallel computing
- Worked through several projects (including one as PI for *m/q* initiative) to analyze chemical spaces and signatures for improved prediction and detection of chemicals of interest
  - **Theory:** Tandem mass spectrometry, principle component analysis for dimension reduction, molecular fingerprints, UMAP, graph neural networks
  - **Tools:** Python *(pandas, numpy, matplotlib, scipy, pyTorch, UMAP)*, high performance computing
- Worked through several projects to identify and quantify DNA manipulation, created visualizations for various methods of statistical analysis
  - **Theory:** Phred scores, contig assembly, topological data analysis, LSTM recurrent neural networks, random forests, clustering, outlier detection, anomaly detection
  - **Tools:** BBTools, FASTA/FASTQ processing, R *(tidyverse)*, Python *(pandas, numpy, matplotlib, keras, sklearn, scipy, pyTorch, UMAP)*

The Research and Analysis Center, U.S. Army Futures Command Fort Leavenworth, KS
Operations Research Analyst July 2019 - July 2020
- Multi-Domain Operations concept analysis: optimization of multi-attribute decision making models with sensitivity analysis
  - **Theory:** Optimization, sensitivity analysis, decision theory
  - **Technical skills:** Python *(pyomo, numpy)*, R *(ompr, dplyr)*, Microsoft Office
- Task Organization optimization and database tool with GUI *(Project Lead)*
  - **Theory:** Databases, optimization, visualizations

- **Technical skills:** Python *(pandas)*, R/R Shiny *(tidyverse, shinydashboard)*, project management

Department of Mathematical Sciences, Montana State University Bozeman, MT
Graduate Assistant Fall 2015 - Spring 2019

- Novel biphasic DNA amplification reaction model
  - **Theory:** Nonlinear dynamics, multiple time scales/invariant manifolds, perturbation theory, mass action reaction kinetics, sensitivity analysis
  - **Technical skills:** MATLAB, LaTeX

Bend Research, a division of Capsugel Bend, OR
Research & Development Intern Summer 2017

- Bi-component droplet drying model
  - **Theory:** PDE theory, numerical solutions to PDEs, transport phenomena, combustion models
  - **Technical skills:** MATLAB, LaTeX, Microsoft Office

SERVICE

Peer Review June 2024 - Present

- Nature Communications
- ACS Omega
- Journal of Chemical Information and Modeling

Association for Women in Mathematics January 2022 - January 2025

- Scientific Advisory Committee

PNNL EBSD Diversity & Inclusion Council Spring 2021 - June 2023

- Inclusivity committee

57^{th} **Army Operations Research Symposium planning committee** Fall 2019

- Registration and social committees

Women in Science & Engineering Mentor Program Spring 2018 - Spring 2019

- *Demystifying Graduate School* kickoff event panel speaker

Graduate Employee Organization of Montana State University

- Organizing Committee Chair Fall 2016 - Spring 2018
- President, Bargaining Committee Chair Fall 2015 - Spring 2016
- Vice President Fall 2014 - Spring 2015

AWARDS AND HONORS

PNNL Scientist and Engineer Rising Leader Fall 2024

Department of the Army Certificate of Appreciation, "Garrison Gate Closure Analysis" Fall 2019

Department of Defense SMART Scholarship Fall 2018

- Provide tuition, a health care and supplies supplement, and a $38,000 stipend for a year of study
- Employment with a U.S. Army federal lab upon degree completion

Featured by Bozeman 500 Women Scientists' "Meet a Local Scientist" spotlight Spring 2018

Women In Science & Engineering Seminar Speaker, "A Study in Change" Spring 2018

Gary G. Sackett Travel Awards in Applied Mathematics

- Travel costs to AARMS-PIMS Summer School Summer 2015
- Housing costs for 4^{th} International SSBSS Summer 2017