# *Gokul Bhusal*

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## *Education*

**Michigan State University** — *East Lansing, MI*
*Doctoral candidate in Applied Mathematics* — *August 2020 - May 2026 (Expected)*
*Thesis Advisor: Dr. Ekaterina Merkurjev*

**The University of Southern Mississippi** — *Hattiesburg, MS*
*B.S. Mathematics & Minor in Computer Science, Magna cum laude* — *August 2016 - May 2020*
*Advisor: Dr. Zhifu Xie*

## *Research Interests*

Graph-based methods, Active learning, Optimization, Image processing.

## *Publications*

- Adaptive Graph-based Algorithms for Data Summarization with Kevin Miller and Ekaterina Merkurjev (In preparation).
- Hyperspectral Image Unmixing with Endmember Bundles and Different Sparsity Promoting Functions, with Ekaterina Merkurjev (MSU), Cristina Garcia-Cardona (Los Alamos), and Yifei Lou (UNC) (In preparation).
- **Gokul Bhusal**, Kevin Miller, Ekaterina Merkurjev, MALADY: Multiclass Active Learning with Auction Dynamics on Graphs (Submitted).
- **Gokul Bhusal**, Ekaterina Merkurjev, Guo-Wei Wei, Persistent Laplacian-enhanced Algorithm for Scarcely Labeled Data Classification, *Machine Learning (2024).*
- Zhifu Xie, **Gokul Bhusal**, Hamas Tahir, Central Configurations in the Planar 6-body Problem Forming Two Equilateral Triangles, *Journal of Geometry and Physics.*

## *Teaching Experience*

- Spring 2025: Teaching Assistant for Mathematics of Machine learning (Math 483), MSU
- Summer 2024: Teaching Assistant for Matrix Algebra with Computational Applications (Math 314), MSU
- Spring 2024: Teaching Assistant for Numerical methods for ODE (Math 852), MSU
  - Qualifying exam course. Hosted weekly qual-prep recitations.
- Fall 2023: Teaching Assistant for Numerical Analysis I (Math 850), MSU
  - Qualifying exam course. Hosted weekly qual-prep recitations.
- Spring 2023: Teaching Assistant for Matrix Algebra with Computational Applications (Math 314), MSU
- Fall 2022: Recitation Instructor for Calculus II (Math 133), MSU
- Summer 2022: Instructor of record for Calculus I (Math 132), MSU
- Spring 2022: Recitation Instructor for Calculus II (Math 133), MSU

- Fall 2021: Recitation Instructor for Calculus II (Math 133), MSU
- Summer 2021: Recitation Instructor for Calculus II (Math 133), MSU

### *Honors and Awards*

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| 2025 | Douglas A. Spragg Endowed Fellowship - MSU-Math |
| 2024 | Outstanding Scholar Fellowship - College of Natural Science, MSU |
| 2024 | TA Award for Excellence in Teaching - Department of Mathematics at MSU |
| 2024 | Herbert T.Graham Scholarship - MSU-Math |
| 2023 | Outstanding Scholar Fellowship - College of Natural Science, MSU |
| 2020 | Early Start Fellowship - College of Natural Science, MSU. |
| 2018 | Placed 2nd in the Louisiana/Mississippi region's Mathematical Association of America Research Paper Competition. |
| 2018 | Received travel grant for poster presentation at JMM 2018 |
| 2018 | Nominated for the College of Science and Technology's Outstanding Sophomore Award, USM |

### *Invited Talks/Conference Presentations/Posters*

- SIAM Conference on Mathematics of Data Science (MDS24), Atlanta, October 21–25 , 2024 (Poster Presentation)
- 2024 SIAM Student Mini-Symposium in Applied Mathematics, University of Michigan, Sep 15 (talk)
- $88^{th}$ Midwest PDE Seminar, The Ohio State University, April 26-28, 2024
- SIAM Great Lakes Meeting, Michigan State University, Oct 14, 2023 ( talk).
- LA/MS Mathematical Associations of America, Loyola University New Orleans, February 2020 (Oral Presentation)
- USA/USM/SELU Math and Physics Research Mini-Conference, Gulf Park, MS, April 2019 (Oral Presentation)
- Undergraduate Symposium on Research and Creative Activity, Hattiesburg, MS, March 2018 (Poster Presentation)
- Joint Mathematics Meeting San Diego, CA, January 2018 (Poster Presentation)

### *Summer school and Workshop attended*

- Workshop: Fusing Theory and Practice of Graph Algorithms, ICERM, Feb 20 - Feb 22, 2025
- Optimal Transport Through the Midwest summer school, University of Wisconsin Madison, July 15 - July 19, 2024.
- Winter School in Machine Learning 2024, UT-Austin. January 15-19, 2024
  - Mathematics of adversarial machine learning
  - Tensor Methods in Data Science
- Research Experience for Undergraduate (REU) 2019 June 03 - July 19
  School of Mathematics and Natural Sciences, The University of Southern Mississippi, Hattiesburg, MS
  Topic: Allee Effects in a Predator-prey Model with Holling type-IV functional Response.

- Research Experience for Undergraduate (REU) 2017 June 19 - August 4
  School of Mathematics and Natural Sciences, The University of Southern Mississippi, Hattiesburg, MS
  Topic: Stacked Central Configuration for 6-body Problem.

### *Outreach*

- Outreach Volunteer, student poster presentation judge at 2024 AGEP Student Success Conference, MSU, Oct 4, 2024.
- Outreach Volunteer, Marble Elementary School Math Night, November 16, 2023.
- Served as an instructor in the TRIO SSS program (Summer 2022, Summer 2023).

### *Conference/Seminar Organization*

- Co-organizer (with Edem Boahen) of Student Applied Mathematics seminar, MSU, Fall 2023 - present.

### *Relevent Skills*

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| Proficiency | MATLAB, HPCC Environments, C++, Python, LaTeX. |

### *Services and Professional Organization*

- **Representative of Math department**, Council of Graduate Students (COGS), Fall 2024–Spring 2025
- **Secretary**, American Math Society, MSU chapter, Fall 2023–Spring 2024
- **Treasurer**, Nepali student Association, Summer 2021–Fall 2022
- **Member**, AMS, Fall 2020 – Present.
- **Member**, SIAM, Fall 2016 – Present.
- **Treasurer** Kappa Mu Epsilon, Fall 2018– Spring 2020

### *Selected Graduate Coursewrork*

- Measure theory
- Complex analysis
- Numerical linear algebra
- Numerical methods for ODE
- Introduction to PDE (two semesters)
- Mathematics of Data Science
- Topological Data Analysis
- Machine Learning
- Graph Theory
- Deep Learning
- High Dimensional Probability
- Computational Optimization
- Harmonic Analysis
- Sublinear-Time Algorithms and SFTs (Hot Topic Short Course)
- Hamilton–Jacobi Equation
- Numerical methods for Optimal Transport (Hot Topic Short Course)
- Computational Inverse Problem