Rahul Gomes
https://www.uwec.edu/profiles/gomesr/
Web of Science Profile
Google Scholar Profile

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Education

North Dakota State University — Fargo, ND
Ph.D., Computer Science — *Dec 2019*
Dissertation Title: Incorporating Sliding Window-Based Aggregation for Evaluating Topographic Variables in Geographic Information Systems

Sikkim Manipal University — Sikkim, India
M.S., Computer Science — *April 2014*

St.Xavier's College, — Kolkata, India
B.Ed., Science — *August 2012*

St.Xavier's College, — Kolkata, India
B.S., Computer Science — *June 2010*

Employment

Assistant Professor, University of Wisconsin - Eau Claire	July 2020 - Present
Assistant Professor, Minot State University	Aug 2019 - June 2020
Instructor, Minot State University	Aug 2018 - Aug 2019
Adjunct Lecturer, Dakota College at Bottineau	Aug 2019 - Dec 2019
CS Instructor, Johns Hopkins Center for Talented Youth	Jul 2018 - Aug 2018

Teaching Experience

University of Wisconsin - Eau Claire

- CS 145 – Programming for New Programmers (Java) — Fall 2020
- CS 146 – Big Picture in Computer Science — Fall 2021, and 22; Spring 2022
- CS 268 – Web Systems — Fall 2020, 2021, and 2022; Spring 2021, and 2022
- CS 318 – Fundamentals of Web Page Design — Summer 2021, and 2022
- CS 330 - Programming Languages — Spring 2022; Fall 2022
- CS 376 – Cryptography and Network Security — Spring 2021
- CS 396 – Junior Seminar — Fall 2021, and 2022
- CS 491 – Special Topics: Data Mining — Spring 2021
- CS 491/426 – Deep Learning — Winterim 2021; Fall 2021

Minot State University

- CSCI 111 – Introduction to Web Languages — Fall 2018, and 2019
- CSCI 160 – Computer Science 1 (C++) — Spring 2019, and 2020
- CSCI 340 – Computer Networks — Fall 2018, and 2019
- CSCI 356 – Database Management 1 — Fall 2018, and 2019
- CSCI 450 – Operating Systems — Spring 2020
- CSCI 456 – Database Management 2 — Spring 2019
- CSCI 458 – Network Security — Spring 2019, and 2020

Dakota College at Bottineau

- ASC94 – Beginning Algebra — Fall 2019

Teaching Assistant - North Dakota State University

- CSCI 114 – Microcomputer Packages — Fall 2017; Spring 2017

Research and Grants

National Science Foundation(NSF)-Research Experience for Undergraduates Jun 2022 - Aug 2024
REU Site: Advancing high-performance computing opportunities in undergraduate research at UW-Eau Claire to meet challenges of multidisciplinary computational science. $384,762.
PI: **Rahul Gomes**, Co-PI: Sudeep Bhattacharyay.

Tommy G. Thompson Center on Public Leadership July 2021 - June 2022
Exploring Policies to Promote High-Performance Computing in Post-Pandemic Undergraduate Education in Wisconsin. $94,368.
PI: Ying Ma, Co-PI: **Rahul Gomes**, Sudeep Bhattacharyay.

NDSU, Center for Diagnostic & Therapeutic Strategies in Pancreatic Cancer Nov 2020 - Dec 2022
Using methylation and gene expression data for early detection of pancreatic cancer.
PI: Rick Jansen, Co-PI: **Rahul Gomes**. $30,000

UW-Eau Claire and Mayo Clinic - Research Innovation Council April 2021 - Dec 2022
Detection of Inferior Vena Cava Filters on CT scans using Artificial Intelligence Algorithm. $33,965
PI: Dr. Joe Wildenberg M.D., Ph.D., Co-PI: **Rahul Gomes**.

Mayo Clinic Health System AI initiative May 2021 - May 2023
Predicting Chemotherapy Outcomes in Pancreatic Ductal Adenocarcinoma (PDAC) Patients Using CT Scan as A Biomarker with Help Of Artificial Intelligence.
Mayo PI: Dr. Sushil Kumar Garg. UWEC PI: **Rahul Gomes**.

Biomedical Innovation Grant-Mayo Collaborative Research Program May 2021 - May 2023
Comparison of pathways in humans and genetically engineered mouse model (GEMM) for Pancreatic Ductal Adenocarcinoma (PDAC). $15,000.
NDSU PI: Rick Jansen. UWEC PI: **Rahul Gomes**.

UW-Eau Claire, ORSP Undergraduate Research Internal Grants Oct 2020- Present

- Deep learning segmentation of kidney tissue microarrays using infrared spectral imaging.
  PI: **Rahul Gomes**, Co-PI: Michael J. Walsh. Sep 2021 - Dec 2022. $5,300.
- Exploring an optimized deep learning framework for analysis of satellite imagery.
  PI: **Rahul Gomes**, Co-PI: Papia Rozario. Oct 2020 - Feb 2022. $13,200.
- A hybrid deep learning model for prediction of severity in COVID-19 patients.
  PI: **Rahul Gomes**. Sep 2021 - Jun 2022. $2,500.

NDEPSCoR seed award for faculty to collect preliminary data. Oct 2019-May 2020

- NDCyberGIS: Integrating Big data with intelligent knowledge discovery NoSQL system for geo-visualization and machine learning.
  PI: **Rahul Gomes**, Co-PI: Anne Denton. $9,986.24.
- Cyberpatriot Outreach Program: NDEPSCoR seed award for faculty to engage k12 in STEM outreach activities.
  PI: Darren Seifert, Co-PI: **Rahul Gomes**, Sayeed Sajal. $5,987.34.

University of Wisconsin System, Regent Scholar Grant Proposal Submitted: Nov 2021
Advancing Diagnosis of Pancreatic Ductal Adenocarcinoma from CT Imaging Using Deep Learning. Requested funding: $50,000.*Denied*

NSF - CISE Research Initiation Initiative (CRII) Submitted: Nov 2020
Exploring Deep Learning Architecture Optimization Techniques for High-Dimensional Data. Requested funding: $175,000.*Denied*

Editorial Activities

- Academic Editor, PLOS ONE journal 2022-present
- Abstract Review Leader. National Council for Undergraduate Research (NCUR). UW- Eau Claire. 2023
- Publications Chair, IEEE Conference on Electro-Information Technology, Lewis University. 2023
- Reviewer, National Science Foundation (NSF), Graduate Research Fellowship Program (GFRP). 2023
- Publications Chair, IEEE Conference on Electro-Information Technology, Minnesota State University, Mankato. 2022
- Session Chair, IEEE Conference on Electro-Information Technology, Central Michigan University. 2021
- Reviewer - Web of Science Profile
  - IEEE - Access;Transactions on Industrial Informatics.
  - ACM - Transactions on Privacy and Security.
  - MDPI - Electronics; Applied Sciences; Sensors; ISPRS International Journal of Geo-Information; Remote Sensing; Future Internet; Machine Learning and Knowledge Extraction; Computation; and Mathematics.
- Session Chair & Programming Competition Judge, Midwest Instruction and Computing Symposium, North Dakota State University. 2019.

Professional Activities

- Faculty Administrator, Blugold Center for High Performance Computing. 2021-present
- Partner, Broadening Participation in Computing in the state of Wisconsin using ICICLE High Performance Computing Infrastructure. 2022-present
- UW-Eau Claire Faculty Advisor, Student Association for Computing Machinery (SACM). 2021-present
- UW-Eau Claire Computer Science Department Faculty Senator. 2021-present
- UW-Eau Claire Senate Academic Policies Committee Member. 2021-present
- Vice-Chair, IEEE Region 4 Twin Cities Section. 2022-Present
- UW-Eau Claire College of Arts and Science Curriculum Committee Member. 2021-2022
- Secretary, IEEE Region 4 Twin Cities Section. 2021
- UW-Eau Claire Faculty Search Committee for Asst. Professor of Computer Science. 2021
- Minot State University Diversity Council Member. 2019

Peer Reviewed Publications in Conferences and Journals

: Name indicates student researcher

1. **Gomes Rahul**, Kamrowski Connor, Mohan Pavithra, Langlois Jordan, and Wildenberg Joe. October 2022. "IVC filter detection using an artificial intelligence approach." *Diagnostics.* https://doi.org/10.3390/diagnostics12102475
2. **Gomes Rahul**, Paul Nijhum, He Nichol, Huber Aaron, and Jansen Rick. August 2022. "Application of feature selection and deep learning for cancer prediction using DNA methylation markers." *Genes.* https://doi.org/10.3390/genes13091557
3. Denton Anne, **Gomes Rahul**, Schwartz David, and Franzen David. August 2022. "Large-Window Curvature Computations for High-Resolution Digital Elevation Models." *IEEE Transactions on Geoscience and Remote Sensing.* https://doi.org/10.1109/TGRS.2022.3200354
4. Gomes Rahul, Kamrowski Connor, Langlois Jordan, Rozario Papia, Dircks Ian, Grottodden Keegan, Martinez Matthew, Tee Wei Zhong, Sargeant Kyle, LaFleur Corbin, Haley Mitchell. July 2022. "A Comprehensive Review of Machine Learning Used to Combat COVID-19". *Diagnostics." 2022; 12(8):1853.* https://doi.org/10.3390/diagnostics12081853
5. Ahsan Mostofa, Nygard, Kendall, **Gomes Rahul**, Chowdhury Minhaz, Rifat Nafiz, and Connolly Jayden. July 2022. "Cybersecurity Threats and Their Mitigation Approaches Using Machine Learning—A Review." *Journal of Cybersecurity and Privacy 2, no. 3 (2022): 527-555.* https://doi.org/10.3390/jcp2030027
6. Rifat Nafiz, Ahsan Mostofa, Chowdhury Minhaz, **Gomes Rahul**. May 2022. " BERT Against Social Engineering Attack: Phishing Text Detection." *2022 IEEE International Conference on Electro Information Technology (eIT) 2022 May 19 (pp. 1-6). IEEE.* https://doi.org/10.1109/eIT53891.2022.9813922
7. Ahsan Mostofa, Rifat Nafiz, Chowdhury Minhaz and **Gomes Rahul**. May 2022." Detecting Cyber Attacks: A Reinforcement Learning Based Intrusion Detection System." *2022 IEEE International Conference on Electro Information Technology (eIT) 2022 May 19 (pp. 461-466). IEEE.* https://doi.org/10.1109/eIT53891.2022.9813892
8. Ahsan Mostofa, Rifat Nafiz, Chowdhury Minhaz and **Gomes Rahul**. May 2022."Intrusion Detection for IoT Network Security with Deep Neural Network." *2022 IEEE International Conference on Electro Information Technology (eIT) 2022 May 19 (pp. 467-472). IEEE.* https://doi.org/10.1109/eIT53891.2022.9814006
9. Rifat Nafiz, Ahsan Mostofa, **Gomes Rahul** and Chowdhury Minhaz. May 2022."COVID-19 Sentiment Analysis applying BERT." *2022 IEEE International Conference on Electro Information Technology (eIT) 2022 May 19 (pp. 417-422). IEEE.* https://doi.org/10.1109/eIT53891.2022.9813777
10. Ahsan Mostofa, **Gomes Rahul**, Chowdhury Minhaz, and Nygard Kendall. March 2021. "Enhancing Machine Learning Prediction in Cybersecurity Using Dynamic Feature Selector." *Journal of Cybersecurity and Privacy 1, no. 1 (2021): 199-218.* https://doi.org/10.3390/jcp1010011
11. Rozario Papia F., and **Gomes Rahul**. July 2021. "Comparison of data mining algorithms in remote sensing using Lidar data fusion and feature selection." *2021 IEEE International Conference on Electro/Information Technology, Mount Pleasant, MI.* https://doi.org/10.1109/EIT51626.2021.9491878
12. **Gomes Rahul**, Rozario Papia F., and Adhikari Nishan. July 2021."Deep Learning optimization in remote sensing image segmentation using dilated convolutions and ShuffleNet" *2021 IEEE International Conference on Electro/Information Technology, Mount Pleasant, MI.* https://doi.org/10.1109/EIT51626.2021.9491910
13. **Gomes Rahul**, Denton Anne and Franzen David. April 2019. "Quantifying efficiency of sliding-window based aggregation technique by using predictive modelling on landform attributes derived from DEM and NDVI." *ISPRS International Journal of Geo-Information 8, no. 4 (2019).* https://doi.org/10.3390/ijgi8040196
14. **Gomes Rahul**, Denton Anne and Franzen David. May 2019. "Comparing classification accuracy of NDVI with DEM derived attributes using multi-scalar approach in Geographic Information Systems." *2019 IEEE International Conference on Electro/Information Technology (EIT). Brookings, SD.* https://doi.org/10.1109/EIT.2019.8833766

15. **Gomes Rahul**, Denton Anne and Straub Jeremy. May 2019. "Comparative study of fitness function in genetic algorithm for optimal site allocation using Lidar." *2019 IEEE International Conference on Electro/Information Technology (EIT). Brookings, SD.* https://doi.org/10.1109/EIT.2019.8833664
16. Ahsan, Mostofa, **Gomes Rahul**, and Denton Anne. May 2019."Application of a Convolutional Neural Network using transfer learning for tuberculosis detection." *2019 IEEE International Conference on Electro/Information Technology (EIT).Brookings, SD.* https://doi.org/10.1109/EIT.2019.8833768
17. **Gomes, Rahul**, Ahsan Mostofa, and Denton Anne. May 2018. "Random Forest Classifier in SDN Framework for User-Based Indoor Localization." *2018 IEEE International Conference on Electro/Information Technology (EIT).* https://doi.org/10.1109/EIT.2018.8500111
18. Denton, Anne, **Gomes Rahul**, and David Franzen. May 2018. "Scaling up Window-Based Slope Computations for Geographic Information System." *2018 IEEE International Conference on Electro/Information Technology (EIT).* https://doi.org/10.1109/EIT.2018.8500288
19. Ahsan, Mostofa, **Gomes Rahul**, and Denton Anne. May 2018. "SMOTE Implementation on Phishing Data to Enhance Cybersecurity." *2018 IEEE International Conference on Electro/Information Technology (EIT).* https://doi.org/10.1109/EIT.2018.8500086
20. Miryala Goutham, **Gomes Rahul** and Dayananda Karanam. "Comparative analysis of movie recommendation system using collaborative filtering in spark engine." ResearchGate
21. **Gomes Rahul**, and Straub Jeremy. May 2017. "Genetic algorithm for flood detection and evacuation route planning." *SPIE Defense+ Security, International Society for Optics and Photonics, 2017.* https://doi.org/10.1117/12.2266474
22. Nelson, Ryan, Andrew Gabler, Skyler Slusar, Aaron Gordon, John McMillan, **Gomes Rahul**, and Jeremy Straub. September 2017. "Additive Manufacturing (3D Printing) Material and Cost Reduction Algorithm Proof." *AIAA SPACE and Astronautics Forum and Exposition, p. 5225. 2017.* https://doi.org/10.2514/6.2017-5225
23. Dayananda Karanam, **Gomes Rahul**, and Straub Jeremy. September 2017. "An interconnected architecture for an emergency medical response unmanned aerial system." *2017 IEEE/AIAA 36th Digital Avionics Systems Conference (DASC).* https://doi.org/10.1109/DASC.2017.8102118

Poster and Abstract Presentations

1. Wildenberg Joe, Kamrowski Connor, Senor Cameron, Mohan Pavithra, and **Gomes Rahul**."Automated IVC Filter Detection from Abdominopelvic CT Exams using Deep Learning." *Society of Interventional Radiology, 2022.* (Abstract presentation) https://doi.org/10.1016/j.jvir.2022.03.225
2. Adeleke David, **Gomes Rahul**, and Jansen Rick. "Driver gene genomic alterations associated with pancreatic cancer prognosis". *Society for Epidemiologic Research 2022 Annual Meeting, Chicago, IL.*
3. Paul Nijhum, Jansen Rick, **Gomes Rahul**, He Nichol, and Huber Aaron. October 2021. "A scalable deep learning framework for breast cancer prediction using DNA methylation data." *American Society of Human Genetics, ASHG 2021.*(Poster presentation)
4. Dewitte Matt, Rozario Papia, Mohan Devy Pavithra, and **Gomes Rahul**. "Optimizing Deep Learning Architectures for Remote Sensing Image Analysis." *2021 American Association of Geographers Annual Meeting, Virtual Format* (Poster presentation)
5. **Gomes Rahul**, Durant, C., L. Chandra Deb, Y. Ming, Q. Wang, J. Zhao, S. Day, P. Bergholz, and R. Jansen. September 2020. "Virulent Gene Expression Network Analysis and Visualization in E. coli." *80th Annual Meeting of American Society of Microbiology, ND.*(Poster presentation)
6. Denton Anne, **Gomes Rahul**, and Franzen David. "Separating Landform from Noise in High-Resolution Digital Elevation Models through Scale-Adaptive Window-Based Regression." *International Conference on Spatial Statistics and Geostatistics (ICSSG 2019), New York, NY* (Abstract presentation)

7. Durant, C., **Gomes Rahul**, L. Chandra Deb, Y. Ming, Q. Wang, J. Zhao, S. Day, P. Bergholz, and R. Jansen. September 2019. "3D Visualization of Gene Expression Networks in E. coli." *6th AAPS-NDSU Research Symposium, Fargo, ND.*(Poster presentation)
8. **Gomes Rahul**, and Denton Anne, "Incorporating Data Mining and Iterative Aggregation on Geospatial Datasets to Understand Soil Health in Depressions."*ND EPSCoR 2019 State Conference, Fargodome, Fargo, ND* (Poster presentation)
9. **Gomes Rahul**, and Denton Anne. "Taking Terrain Analysis to the Big Data Era for Understanding Soil Health in Depressions." *ND EPSCoR 2018 State Conference, Alerus center, Grand Forks, ND* (Poster and Abstract presentation)
10. **Gomes Rahul**, and Denton Anne. "Application of evolutionary algorithms for disaster management and response." *2018 American Association of Geographers Annual Meeting, New Orleans, LA* (Poster presentation)
11. **Gomes Rahul**, Dayananda Karanam, Straub Jeremy, and Jones Andrew. "Human Spaceflight Robotic Medical First Responder." *68th International Astronautical Congress (IAC), Adelaide, Australia, 25-29 September 2017, IAC-17.*
12. **Gomes Rahul**, and Straub Jeremy. "Analysis of multispectral imaging data and genetic algorithm-based approach towards disaster management and recovery." *2017 NDSU Graduate School's Graduate Research Symposium* (Abstract presentation)

Publications in Regional Conferences Fostering Undergraduate Research Experience

: Name indicates student researcher

1. Huber Aaron, Paul Nijhum, **Gomes Rahul**, and Jansen Rick. April 2021. 'Identification of DNA Methylation Markers using Feature Selection and Deep Learning." *Celebration of Excellence and Research Activity, CERCA 2021.*(Poster presentation) http://digital.library.wisc.edu/1793/82978
2. Mohan Pavithra, Dewitte Matt, **Gomes Rahul**, and Rozario Papia. April 2021. 'Optimizing Deep Learning Architectures for Remote Sensing Image Analysis." *Celebration of Excellence and Research Activity, CERCA 2021.*(Poster presentation) http://digital.library.wisc.edu/1793/83285
3. Witham Michael, Bender Isaiah and **Gomes Rahul**. April 2019."Comparative Analysis of MariaDB's performance efficiency as a suitable replacement for MySQL." *Midwest Instruction and Computing Symposium '19, Fargo, ND.* ResearchGate link to full paper
4. Yi Sumin and **Gomes Rahul**. April 2019."Evaluating the Impact of Time Delays and Start Sequence for Effective Congestion Control Using TCP Reno, Westwood and Vegas." *Midwest Instruction and Computing Symposium '19, Fargo, ND.* ResearchGate link to full paper
5. Kamalanathan Divyaa and **Gomes Rahul**. April 2019."Comparing NoSQL and SQL Database Systems Based on Vulnerability to Injection and Adequacy of Countermeasures." *Midwest Instruction and Computing Symposium '19, Fargo, ND.* ResearchGate link to full paper
6. Griswold Gary, Carrato M, Marcel and **Gomes Rahul**. April 2019."Quantitative Analysis to Verify Fairness of TCP CUBIC in NS-2." *Midwest Instruction and Computing Symposium '19, Fargo, ND.* ResearchGate link to full paper
7. **Gomes Rahul**, Ahsan Mostofa and Denton Anne. April 2018. "Fusion of SMOTE and outlier detection techniques for land-cover classification using Support Vector Machines." *Midwest Instruction and Computing Symposium '18, Duluth MN.* Link to full paper

Selected Media Coverage

- "UW-Eau Claire receives major NSF grant for summer undergraduate research. "*All In Wisconsin* March, 2022. Link.
- "Multiple research projects help Blugold gain skills, direction as she looks to future. "*All In Wisconsin* November, 2021. Link.
- "Research helps Blugold discover how computer science, health care intersect. "*All In Wisconsin* October, 2021. Link.
- "What is Bioinformatics and discussion on Bioinformatics major at UW-Eau Claire" *Wisconsin Public Radio's "Spectrum West"*, August, 2021. Link.
- "UW-Eau Claire: Building bridges between health care and higher education to enhance patient care" *All In Wisconsin* July, 2021. Link.
- "UW-Eau Claire, HPE collaboration a powerful partnership. "*All In Wisconsin* April, 2021. Link.
- "Powerful new supercomputer will open doors for research and education at UW-Eau Claire." *Milwaukee Journal Sentinel,* April, 2021. Link.
- "Making big data practical" *North Dakota Established Program to Stimulate Competetive Research (NDESPSCoR) News and Notes* February, 2020. Link.

Invited Talks

- *WiSys SPARK Symposium 2022* ,"Developing Usable Machine Learning Framework for Biomedical Applications", 2022.
- *WiSys Innovation BrainStorm in partnership with Mayo Clinic and UW-Eau Claire* ,"How big data is changing the healthcare industry", 2021.
- *Student Association for Computing Machinery (ACM), UW-Eau Claire*,"Preparing for graduate school", 2020.
- *Denison University*,"Optimizing image analysis techniques for processing high resolution spatial big data", 2019.
- *St. Mary's College of California*, "Optimizing image analysis techniques for processing high resolution spatial big data", 2019.
- *University of Wisconsin-Oshkosh*, "Optimizing image analysis techniques for processing high resolution spatial big data", 2019.
- *University of Wisconsin-Eau Claire*, "Optimizing image analysis techniques for processing high resolution spatial big data", 2019.
- *Minot State University*, "Analysis of multispectral imaging data and genetic algorithm based approach towards disaster management and recovery", 2018.
- *Minnesota State University, Mankato*, "Analysis of multispectral imaging data and genetic algorithm based approach towards disaster management and recovery", 2018.

Academic Scholarships and Awards

- Best Oral Presentation Award, International Conference on Spatial Statistics and Geostatistics (ICSSG) New York, NY. 2019
- Academic Excellence in Computer Science Award, NDSU College of Science and Mathematics. 2018
- Rahul Devabhaktuni Memorial Scholarship Award, NDSU Dept. of Computer Science. 2017, 2018
- Best speaker award, Third place, Midwest Instruction and Computing Symposium, Duluth, MN. 2018
- Best Speaker Award, First place, NDSU Graduate Research Symposium. 2017
- Student travel grant recipient, NDSU College of Science & Mathematics. 2016, 2017
- General Secretary, Department of Education, St. Xavier's College Kolkata. 2011-2012