

CHETRAJ PANDEY

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🔍 [Google Scholar](#)

🌐 [LinkedIn](#)

🆔 [ORCID](#)

Education

- Jan, 2021 – Present • **Ph.D. in Computer Science**, Georgia State University, Atlanta, GA, USA.
Advisor: [Dr. Berkay Aydin](#)
Thesis Title: “Explainable Deep Learning For Prediction Of Rare Events”
Expected Graduation Date: **July, 2025**.
- Jan, 2021 – Aug, 2024 • **M.S in Computer Science**, Georgia State University, Atlanta, GA, USA.
Advisor: [Dr. Berkay Aydin](#)
- Nov, 2013 – Aug, 2017 • **B.E. Computer Engineering**, Tribhuvan University, IOE, ERC, Dharan, Nepal.

Research Interests

Explainable Deep Learning Pattern Recognition Image Processing & Analysis Continual Learning

Work Experience

Research Experience

- Jan, 2021 – Present • **Research Assistant**, [Data Mining Lab](#), Georgia State University.
Leading projects on developing interpretable/explainable deep learning-based models for the prediction of rare events, specifically solar flares, and developing novel techniques in computer science to solve problems in solar physics and space weather forecasting applications.
- Jun, 2024 – Aug, 2024 • **Scientific Researcher**, [Frontier Development Lab](#) (FDL), Trillium Technologies in partnership with NASA, Google Cloud, and NVIDIA.
Leading machine learning and continual learning aspects of a state-of-the-art project on developing data-driven solution to predict geomagnetic perturbations at ground stations.
- May, 2019 – Dec, 2020 • **Research Project Coordinator**, Research and Innovation Unit, HCOE.
Supervised research-oriented projects of undergraduate students in computer and electronics engineering, Tribhuvan University, Himalaya College of Engineering (HCOE), Lalitpur, Nepal.

Teaching Experience




- Jan, 2024 – Apr, 2024 • **Instructor/Teaching Fellow**, Georgia State University, Atlanta, GA, USA.
★ Spring 2024, CSC 4780/6780 & DSCI 4780, undergraduate & graduate students, Fundamentals of Data Science.
- Apr, 2020 – Dec, 2020 • **Lecturer**, Tribhuvan University, Himalaya College of Engineering, Nepal.
★ Spring 2020, BCT Juniors, Artificial Intelligence.
★ Spring 2020, BEX Sophomores, Discrete Mathematics.

Work Experience (continued)







- Apr, 2018 – Mar, 2020 ● **Assistant Lecturer**, Tribhuvan University, Himalaya College of Engineering.
★ Fall 2019, B.Sc. CSIT Juniors, Artificial Intelligence.
★ Fall 2019, BCE Freshmen, Computer Programming.
★ Spring 2019, BCT Juniors, Artificial Intelligence.
★ Spring 2019, BEX Sophomores, Discrete Mathematics.
★ Fall 2018, BCE Freshmen, Computer Programming.
★ Spring 2018, BEX Sophomores, Discrete Mathematics.
★ Spring 2018, BCT Sophomores, Numerical Methods.
- Sept, 2018 – Dec, 2020 ● **Instructor / Co-founder**, [Line Academy](#), [Kupondole](#), Lalitpur, Nepal.
★ Computer Programming in C and Fortran
- Dec, 2017 – Apr, 2018 ● **Part-time Instructor**, Tribhuvan University, KEC, Kalimati, Lalitpur, Nepal.
★ Fall 2017, BCT Freshmen, Computer Programming.









Peer-reviewed Publications

Journal Articles







- 1 T. Adeyeha, **C. Pandey**, and B. Aydin, "Tamag: A python library for transformation and augmentation of solar magnetograms," *SoftwareX*, vol. 29, p. 102 032, Feb. 2025, ISSN: 2352-7110.  DOI: [10.1016/j.softx.2024.102032](https://doi.org/10.1016/j.softx.2024.102032).
- 2 K. Whitman, R. Egeland, I. G. Richardson, ..., **C. Pandey**, and et al., "Review of solar energetic particle models," *Advances in Space Research*, Aug. 2023.  DOI: [10.1016/j.asr.2022.08.006](https://doi.org/10.1016/j.asr.2022.08.006).
- 3 **C. Pandey**, A. Ji, R. A. Angryk, M. K. Georgoulis, and B. Aydin, "Towards coupling full-disk and active region-based flare prediction for operational space weather forecasting," *Frontiers in Astronomy and Space Sciences*, vol. 9, Aug. 2022.  DOI: [10.3389/fspas.2022.897301](https://doi.org/10.3389/fspas.2022.897301).

Conference Proceedings

- 1 T. Adeyeha, **C. Pandey**, and B. Aydin, "Large scale evaluation of deep learning-based explainable solar flare forecasting models with attribution-based proximity analysis," in *2024 IEEE International Conference on Big Data (BigData)*, 2024, pp. 1209–1214.  DOI: [10.1109/BigData62323.2024.10825177](https://doi.org/10.1109/BigData62323.2024.10825177).
- 2 **C. Pandey**, T. Adeyeha, J. Hong, R. A. Angryk, and B. Aydin, "Advancing solar flare prediction using deep learning with active region patches," in *Machine Learning and Knowledge Discovery in Databases. Applied Data Science Track*, Springer Nature Switzerland, 2024, pp. 50–65, ISBN: 9783031703812.  DOI: [10.1007/978-3-031-70381-2_4](https://doi.org/10.1007/978-3-031-70381-2_4).
- 3 A. Ji, **C. Pandey**, and B. Aydin, "Towards hybrid embedded feature selection and classification approach with slim-tsfc," in *Big Data Analytics and Knowledge Discovery*, Springer Nature Switzerland, 2024, pp. 91–105, ISBN: 9783031683237.  DOI: [10.1007/978-3-031-68323-7_7](https://doi.org/10.1007/978-3-031-68323-7_7).
- 4 **C. Pandey**, A. Ji, J. Hong, R. A. Angryk, and B. Aydin, "Embedding ordinality to binary loss function for improving solar flare forecasting," in *2024 IEEE 11th International Conference on Data Science and Advanced Analytics (DSAA)*, IEEE, 2024.  DOI: [10.1109/DSAA61799.2024.10722839](https://doi.org/10.1109/DSAA61799.2024.10722839).
- 5 **C. Pandey**, R. A. Angryk, and B. Aydin, "Unveiling the potential of deep learning models for solar flare prediction in near-limb regions," in *2023 International Conference on Machine Learning and Applications (ICMLA)*, IEEE, Dec. 2023.  DOI: [10.1109/icmla58977.2023.00103](https://doi.org/10.1109/icmla58977.2023.00103).
- 6 J. Hong, **C. Pandey**, A. Ji, and B. Aydin, "An innovative solar flare metadata collection for space weather analytics," in *2023 International Conference on Machine Learning and Applications (ICMLA)*, Dec. 2023, pp. 408–413.  DOI: [10.1109/ICMLA58977.2023.00063](https://doi.org/10.1109/ICMLA58977.2023.00063).

- 7 J. Hong, A. Ji, **C. Pandey**, and B. Aydin, "Enhancing solar flare prediction with innovative data-driven labels," in *2023 IEEE 5th International Conference on Cognitive Machine Intelligence (CogMI)*, IEEE, Nov. 2023.  DOI: [10.1109/cogmi58952.2023.00035](https://doi.org/10.1109/cogmi58952.2023.00035).
- 8 **C. Pandey**, R. A. Angryk, M. K. Georgoulis, and B. Aydin, "Explainable deep learning-based solar flare prediction with post hoc attention for operational forecasting," in *Discovery Science*, Cham: Springer Nature Switzerland, Oct. 2023, pp. 567–581.  DOI: [10.1007/978-3-031-45275-8_38](https://doi.org/10.1007/978-3-031-45275-8_38).
- 9 **C. Pandey**, A. Ji, T. Nandakumar, R. A. Angryk, and B. Aydin, "Exploring deep learning for full-disk solar flare prediction with empirical insights from guided grad-cam explanations," in *2023 IEEE 10th International Conference on Data Science and Advanced Analytics (DSAA)*, IEEE, Oct. 2023.  DOI: [10.1109/dsaa60987.2023.10302639](https://doi.org/10.1109/dsaa60987.2023.10302639).
- 10 **C. Pandey**, R. A. Angryk, and B. Aydin, "Explaining full-disk deep learning model for solar flare prediction using attribution methods," in *European Conference on Machine Learning and Knowledge Discovery in Databases: ADS Track, ECML PKDD*, Cham: Springer Nature Switzerland, Sep. 2023, pp. 72–89.  DOI: [10.1007/978-3-031-43430-3_5](https://doi.org/10.1007/978-3-031-43430-3_5).
- 11 **C. Pandey**, A. Ji, R. A. Angryk, and B. Aydin, "Towards interpretable solar flare prediction with attention-based deep neural networks," in *2023 IEEE Sixth International Conference on Artificial Intelligence and Knowledge Engineering (AIKE)*, IEEE, Sep. 2023.  DOI: [10.1109/aike59827.2023.00021](https://doi.org/10.1109/aike59827.2023.00021).
- 12 J. Hong, A. Ji, **C. Pandey**, and B. Aydin, "Beyond traditional flare forecasting: A data-driven labeling approach for high-fidelity predictions," in *Big Data Analytics and Knowledge Discovery*, Springer Nature Switzerland, Aug. 2023, pp. 380–385.  DOI: [10.1007/978-3-031-39831-5_34](https://doi.org/10.1007/978-3-031-39831-5_34).
- 13 **C. Pandey**, R. Angryk, and B. Aydin, "Deep neural networks based solar flare prediction using compressed full-disk line-of-sight magnetograms," in *Information Management and Big Data*, Springer International Publishing, 2022, pp. 380–396.  DOI: [10.1007/978-3-031-04447-2_26](https://doi.org/10.1007/978-3-031-04447-2_26).
- 14 **C. Pandey**, R. A. Angryk, and B. Aydin, "Solar flare forecasting with deep neural networks using compressed full-disk HMI magnetograms," in *2021 IEEE International Conference on Big Data (Big Data)*, IEEE, Dec. 2021, pp. 1725–1730.  DOI: [10.1109/bigdata52589.2021.9671322](https://doi.org/10.1109/bigdata52589.2021.9671322).

Posters

- 1 **C. Pandey**, R. A. Angryk, and B. Aydin, *Towards reliable deep learning models for solar flare prediction*, AGU, Authorea Inc., 2024.  DOI: [10.22541/essoar.173457205.58483493/v1](https://doi.org/10.22541/essoar.173457205.58483493/v1).
- 2 B. K. Jha, **C. Pandey**, O. Issan, *et al.*, *Geo-cloak: Operational machine learning tool for global geomagnetic field perturbation forecasting*, AGU, 2024.  URL: <https://agu24.ipostersessions.com/Default.aspx?s=DD-D3-39-9E-63-33-D6-D8-6A-DE-10-39-03-5F-06-D5>.
- 3 J. Hong, **C. Pandey**, and B. Aydin, *Enhancing solar flare prediction with integrated multi-wavelength imagery and conformal prediction*, AGU24, 2024.  URL: <https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1698807>.
- 4 **C. Pandey**, T. Adeyeha, T. Nandakumar, A. Rafal, and B. Aydin, *Insights into deep learning-based full-disk solar flare prediction with post hoc explanation and evaluation*, 2023, EarthCube 2023 - A Geoscience and Cyberinfrastructure Workshop.  DOI: [10.13140/RG.2.2.34673.97124](https://doi.org/10.13140/RG.2.2.34673.97124).
- 5 **C. Pandey**, M. K. Georgoulis, B. Aydin, R. A. Angryk, and A. Ji, *Exploring heuristics in full-disk aggregation from individual active region prediction of solar flares*, Jul. 2022, p. 3457.  DOI: [10.13140/RG.2.2.34673.97124](https://doi.org/10.13140/RG.2.2.34673.97124).
- 6 **C. Pandey**, A. Ji, R. Angryk, and B. Aydin, *Training and Deployment of Predictive Models for Space Weather Forecasting: An Application on Full-disk and Active Region-based Flare Prediction*, Dec. 2021, AGU Fall Meeting Abstracts, SH55A–1825.  URL: <https://agu2021fallmeeting-agu.ipostersessions.com/Default.aspx?s=5F-7A-C4-11-FE-CA-94-F0-F0-DF-63-FE-6F-17-3E-99>.

Technical Skills

Programming Language	● Python, C, C++, and MATLAB.
Databases	● MySQL and PostgreSQL.
Web Development	● HTML, CSS, JavaScript, and Django.
Libraries and Framework	● Numpy, Pandas, Matplotlib, Scikit-Learn, Pytorch, Tensorflow, and Keras.
Tools	● Git, Github, \LaTeX , Docker, Notion, and Miro.
Computing Environment	● Google Cloud Platform (GCP), and High Performance Computing Environment (HPCE)

Awards and Certifications

Awards and Achievements

Jun 03–07, 2024	● NSF Travel Grant , 11 th Community Coordinated Modeling Center (CCMC), NASA, Community Workshop 2024.
Jun 27–28, 2023	● Early-career Travel Award , EarthCube 2023, Building Upon the EarthCube Community: A Geoscience and Cyberinfrastructure Workshop.
Jan-Dec, 2022	● Google Cloud Student Research Credit , Received Google Cloud Student Research Credit worth \$1,000 as a PhD Student.
May, 2021– Aug, 2022	● Second Century Initiative (2CI), University Doctoral Fellowship , Georgia State University.
Jul, 2016 – Jun, 2017	● 4th Committee President , Association of Computer Engineering Students (ACES), Purwanchal Campus, Dharan, Nepal.
Nov, 2013 – Aug, 2017	● Full Governmental Scholarship on Merit , Bachelors in Computer Engineering at Tribhuvan University, Institute of Engineering, Dharan, Nepal.

Certifications

Jul 14, 2020	● Neural Networks and Deep Learning, Coursera. [certificate] .
Oct 2, 2020	● Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization. [certificate] .
Oct 19, 2020	● Structuring Machine Learning Projects, Coursera. [certificate] .
Mar 18, 2021	● Research Administrators Conduct of Research Course 1, CITI Program. [certificate] .

Service to Profession

2024	● Reviewer , Astronomy and Computing, Journal, 2024.
	● Program Committee Member , 27th International Conference on Discovery Science (DS), 2024.
	● Reviewer , 27th International Conference on Discovery Science (DS), 2024.
	● Reviewer , 23rd International Conference on Machine Learning and Applications (ICMLA), 2024.
	● External Reviewer , 27th International Conference on Pattern Recognition (ICPR), 2024.
2023	● Reviewer , 22nd International Conference on Machine Learning and Applications (ICMLA), 2023.
	● Session Chair , Session 21B, 22nd International Conference on Machine Learning and Applications (ICMLA), 2023.

References

The contact information for all professional references is provided on the following page.

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Johns Hopkins APL,
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