CURRICULUM VITAE

1. Name:

Distinguished Prof. Dr. Biswajeet Pradhan

3. Work Address:

Distinguished Professor

Director, Centre for Advanced Modelling and Geospatial Information Systems (CAMGIS), School of Civil and Environmental Engineering, Faculty of Engineering and Information Technology, University of Technology Sydney, CB11.06.106, Building 11, 81 Broadway, Ultimo NSW 2007 (PO Box 123), Australia, Tel. No.   +61 2 9514 7937

E-mail Address: Biswajeet.Pradhan@uts.edu.au / biswajeet24@gmail.com

4. Academic Qualifications:

- Ph.D., University Putra Malaysia, 2006
- M.Tech., IIT Kanpur, 2000
- M.Sc., IIT Bombay, 1998
- B.Sc., (Hons.) with Distinction: Berhampur University, 1995

5. Brief Career History:-

- Sept 2017- Present, Distinguished Professor, Faculty of Engineering & IT, University of Technology Sydney, Australia
- 2016 - Dec 2017. Full Professor, Faculty of Engineering, University Putra Malaysia (UPM)
- 2010-2016: Associate Professor, Faculty of Engineering, University Putra Malaysia (UPM)
- 2008-2010 Alexander von Humboldt Research Fellow, Dresden University of Technology, Germany
- 2007-2009 Postdoctoral (Concurrent position), Institute of Advanced Technology, University Putra Malaysia (UPM)
- 2005-2007 Senior Manager, Cilix Corporation, Technology Park Malaysia, Kuala Lumpur, Malaysia
- 2002-2004 Senior Lecturer, Asian Institute of Medicine, Science and Technology University, Malaysia

- 1999-2002 Research Scientist, Dresden University of Technology, Dresden, Germany
- 1996-1998- Research Assistant, Indian Institute of Technology (IIT), Bombay

6. Field(s) of Specialization:

Prof. Pradhan is an expert in Geospatial Information Systems (GIS), spatial analysis and modelling of Earth applications specifically hazard and risk assessment. His applications in risk assessments in various environmental settings has earned him an international reputation. He focuses on the use of predictive modelling including integrated and ensemble modelling.

7. Current Research Area / Topics:

Spatial Informatics, Machine Learning, Remote Sensing & GIS, Environmental & Natural Resources Modelling

8. Number of Postgraduate Students Supervised:

Prof. Pradhan has advised 49 PhD students and currently supervises 15 research students.

Program	Status	Number of candidates
PhD	Graduated	30
	Ongoing	12
Masters (with thesis)	Graduated	12
	Ongoing	-
Masters (without thesis)	Graduated	30
	Ongoing	0

9. Achievements / Awards:

His research work has earned him as one of the Highly Cited Researcher by Clarivate Analytics for the last 5 years. He has also been awarded World Class Professor by the Indonesian Ministry of Research, Technology and Higher Education (2018, 2019, 2020) and Research Star Award by the Malaysian Ministry of Education in 2017. He also served as "Ambassador Scientist" for Alexander Humboldt Foundation, Germany with a goal to promote information on its sponsorship programs to research institutions in Southeast Asian countries.

Prof. Pradhan has received 58 awards since 2006 in recognition of excellence in teaching, service and research. Examples include:

- Globally ranked No. 1 in the field of "*Geological & Geomatics Engineering*" during the calendar year 2021. The list is prepared by Stanford University Researchers, USA, which publishes its ranking of the world's top 2% of most highly cited researchers based on Scopus data.
- Top 1% Researcher of the World in 2016, 2017, 2018, 2019, and 2020 by Clarivate Analytics.
- Highly Cited Researcher 2020, 2019, 2018, 2017 and 2016 by Thomson Reuters.
- 2018 – 2020, World Class Professor by the Ministry of Research, Technology and Higher Education, Indonesia
- 2016-2017, Malaysia research Star Award by Ministry of Higher Education, Malaysia
- Humboldt Ambassador Scientist Award of the Alexander von Humboldt Foundation (Germany), 2015 - 2021.
- International Committee on Space Research (COSPAR) Travel Grant Award.
- International Committee on Space Research (COSPAR) Travel Grant Award
- Alexander von Humboldt (AvH) Fellowship Award, Germany, 2008.
- Association of Geographic Information Laboratories Europe (AGILE) Travel Grant Award 2009
- Keith Runcorn Travel Award for Non-Europeans (KRTA): EGU2009 grant award
- Deutscher Akademischer Austausch Dienst (DAAD) Fellowship Award
- Gold Medal for the invention of "Integrated 3D terrain visualizer" by The Belgian and International Trade Fair for Technological Innovation. Brussels. 20 November 2010.
- Gold Medal for the invention of "A New Robust Data Compressor for GIS Spatial Data Compression" by Ministry of Science, Technology and Innovation Malaysia, 2006 (Gold)
- International Trade Fair Medal Award: 2006, Nuremberg, Germany.
- Gold Medal for the invention of "Integrated 3D terrain visualizer" by The Belgian and International Trade Fair for Technological Innovation. Brussels. 20 November 2010.

10. Invited Keynote Presentations:-

Prof. Pradhan has been invited as a keynote speaker and forum panel member for geospatial and remote sensing scientific events internationally and nationally. Since 2013, Prof. Pradhan has delivered 52 keynote and invited talks at international conferences. e.g.:

- The 5th IEEE International Conference on Cybernetics and Computational Intelligence (IEEE CyberneticsCom 2019), Banda Aceh, Indonesia (2019).
- 1st International Conference on Unmanned Aerial System in Geomatics (UASG-2019), IIT Roorkee, India (2019).
- Transport for NSW Geoforum conference (2018)
- 11th Aceh International Workshop and EXPO on Sustainable Tsunami Disaster Recovery (AIWEST – DR 2018)

11. Research Funding/Grants/Support Income:-

Prof. Pradhan has been awarded A$19.5 million to undertake research as outlined below:

- Modernise geotechnical investigation and analysis with machine learning (2023-2025)
- Knowledge Graph for Health Querying Health Data. Source: Surround Australia (2021)
- Credit risk assessment using machine learning (2019-2020)
- Machine Learning modelling to analyse medical data including imaging, video and text-based reports. Industry funding from Cogninet Australia (2021-2022)
- Merging data science, satellite pollen surveillance, & geospatial models for tracking respiratory disease health impacts (2020)
- A robust classifier based on adversarial deep learning for unseen object classifications (2019)
- 3D visualization of highway geometry from mobile laser scanning (LiDAR) dataset (2018)
- Development of an optimized spatial model for orthorectification of high resolution satellite images for urban applications (2018)
- The Catchment Study For Rainfall Induced Debris Flow At Selected Locations Along North-South Expressway Using High Resolution Satellite Images And Statistical Based Spatial Models (2017-2018)
- Development of LMToolbox (Landslide Modelling Toolbox) for Landslide Modelling and Risk Assessments Using ArcGIS and Python Environments (2017-2018)
- Vehicle Emission Modeling and Assessment Emitted From the Traffic at Selected Stretches of NKVE Expressways Using Integrated Geospatial Modelling Technologies (2017)
- Development of traffic noise emission modelling at selected stretches for

estimating and evaluating noise emission level by using GIS (2017)

- Development of Coherence Flood Detection and Novel Ensemble Flood Modelling Approaches Using RADAR Satellite Images in Tropical Area (2017)

- A comprehensive landslide detection, susceptibility, vulnerability and risk assessment along selected stretches of plus expressways using multi-sensor remote sensing data and advanced geospatial models (2015-2016)

- Development of an Automated Hybrid Data Fusion Technique for the Integration of Full-Waveform LiDAR Data with High Spatial Resolution Imaging in an Urban Environment (2016)

- Coherence modelling for rapid flood inundation (2015).

- Forensic analysis on the highway geometric and profiling using high resolution Lidar data (2015-2016)

- Flood hazard and risk analysis for new klang valley expressway (nkve) in sungai damansara water catchment using multi-sensor remote sensing, geographic information system and machine learning based models (2014-2016)

- Terrigenous mass movement analysis of selected areas along the north-south expressways using remote sensing, geographic information system, probabilistic and statistical based models (2013-2015)

- Spatial analysis of zoogeomorphological speleogenesis of birds and bats nest/root sites at Gomantong Cave (2014).

- Spatial analysis of zoogeomorphological speleogenesis of the birds and bats nest/root sites at Gomantong Cave in Malaysia (2014-2016)

- Modelling near-equatorial remote imaging (2014).

- Study On Spectral Bands Synthesis for Mineral Identification and Prediction in Malaysia Using Geospatial Modeling Techniques (2013-2015)

- Seismic Hazard Assessment of Soil Deposits from Peninsular Malaysia: Fundamentals of Earthquake Resistant Design (2013-2015)

- Modelling near equatorial remote imaging: models and methods for image processing (2014-2016)

- Development of an ensemble based modeling algorithm for landslide prediction and forecasting in Malaysia (2012-2013)

- Development of a data driven evidential belief function model to predict potential groundwater zonation in Malaysia (2012-2013)

- Develop operational remote sensing tools for mapping, monitoring and mitigating mass movements (2007).

He has successfully bids for projects funded (>$7M in total):

- National Disaster Data and Information Management System (NADDI) project (2004-2007). NADDI focuses on the management of 5 main natural disasters—forest fires, floods, landslides, oil spills, and "hot-installation". The program addresses the requirement for managing these disasters before, during, and after a disaster.
- Malaysian Airborne Remote Sensing System (MARS) project (2004).

He has undertaken over A$2m contract research with many leading industries in Malaysia and Brunei.

In these projects, he has pioneered new spatial modelling techniques for environmental problems including landslide detection, debris flow, landslides and flood hazards assessment, traffic accident assessment based on highway geometry, vehicle emission modelling, and traffic noise emission modelling.

12. Editorial Experience:-

Editor and Editorial Board Member for 10 international journals e.g. Geoscience Frontiers (Q1- top 5% for multidisciplinary geosciences), Landslides (the #4 ranked journal for geological engineering), Sensors (Q1 for instruments & instrumentation), Remote Sensing (Q1 for remote sensing), Complex & Intelligent Systems (Q2), Geomatics, Natural Hazards & Risk (Q1), Journal of Sensors (Q2) and many more.

13. Professional Activities:-

Prof. Pradhan holds prominent positions in international professional bodies like Committee on Space Research (COSPAR), IEEE and serves as a board member in many South-East Asian national programs. He is also a regular reviewer for various International Science Foundations like European Science Foundation, Dutch Research Council, Austrian Science Foundation, Research Council UK (RCUK), Swiss National Science Foundation, and Belgian Remote Sensing Program. His work has been cited in European and World Bank policy documents.

Prof. Pradhan provides advice as an expert on predicting spatial based natural hazard and risk modeling:
- Advisor for the Department of Mineral and Geosciences, Malaysia, where he evaluates the National Landslide Hazard and Risk Project, 2014 - 2017.
- Committee member, Malaysian National Slope Master Plan Board, Ministry of

Science & Technology, 2016-2022.
- Elected member, Geospatial Working Group, Malaysia (national working group on the Geospatial Blueprint Beyond 2020).
- Scientific Convener for three high level scientific sessions at the European Geoscience Union (EGU 2010) General Assembly, Vienna (Austria), 02–07 May 2010.
- Past chair of the IEEE Geoscience and Remote Sensing Society Malaysia (IEEE-GRSS 2016 – 2017).
- Past member of the United Nations Outer Space Research Programme (UNOOSA 2008 – 2010)).

14. Publications:-

Prof. Pradhan has published 10 books and has contributed in more than 630 scientific journals. He has 55 highly cited papers in the WoS database.

Scopus: Citations: 43,058; H-Index: 107
Google Scholar: Citations: 60,149; H-index: 124
Publons (Web of Science): Citations: 35,933; H-index: 100

Publication	Quantity
Journal	630
Books / Book Series	34
Book Chapters	40
Conference Proceedings/ seminar /workshop	235
Keynote/ Invited Talk	60

15. Identifiable Benefits Outside of Academia:

Prof. Pradhan has developed engineering software for a wide range of spatial analysis tasks including efficient processing of remote sensing data, mass movement detection, landslide hazard assessment, flood modelling, groundwater yield prediction, counting birds and bats in caves, forensic analysis on highways and others. Software he developed has been implemented by several SE Asian Government agencies, including: (i) Malaysian Remote Sensing Agency, (ii) Malaysian Meteorological Department, (iii) Korean Institute of Mineral and Geosciences, and (iv) PLUS Berhad (the largest highway operator company in

Malaysia). Selected examples:

- Using GIS data, he has developed accurate predictive models for assessing the risk of road traffic accidents on Malaysian highways. It is based on advanced deep learning models such as recurrent neural networks. The models offer statistical relationships between road geometry features, traffic accident frequency, and injury severity. These models, and others he has developed for assessing traffic noise and carbon monoxide emissions, have contributed to solving challenges that have serious implications for human health in the environment of densely populated Malaysian cities. The models have been used by PLUS Berhad, the largest highway operator in Malaysia.
- ArcGIS-based toolbox for automatic landslide assessment. Used by highway concessionaires in Malaysia.

His research is cited in European and World Bank policy documents:

- 'Soil Threats in Europe'—EU Law and Publications (Stolte et al. 2015).
- 'Status of the World's Soil Resources'—a publication of the Food and Agricultural Organisation of the UN. (Montanarella et al. 2015).
- 'Climate Impacts in Europe'—EU Law and Publications.
- 'Acting Today for Tomorrow: A Policy and Practice Note for Climate-and Disaster-Resilient Development in the Pacific Islands Region with Supporting Research, Analysis and Case Studies' (World Bank publication).

16. Research Impact in Advancing of Knowledge in his Research Field:-

Prof. Pradhan is an expert in natural hazards, including spatial predictive modelling, hazard and risk assessments. He is one of the pioneers in combining spatial modelling and statistical and machine-learning algorithms in natural hazard predictions such as those for landslides and floods. His major research contributions have combined 2 main discipline areas:

- Spatial analysis and modelling of earth and environmental applications.
- Computational models and techniques for extracting features from multi-sensor remote sensing data

17. List 30 Significant Journal Publications:-

1. Pradhan, B., Lee, S., Dikshit, A., Kim, H. (2023) Spatial flood susceptibility mapping using an explainable artificial intelligence (XAI) model. Geoscience Frontiers, 14(6), 101625. DOI: 10.1016/j.gsf.2023.101625

2. Pradhan, B., Dikshit, A., Lee, S., Kim, H. (2023) An explainable AI (XAI) model for landslide susceptibility modeling. Applied Soft Computing, 142,110324. DOI:

10.1016/j.asoc.2023.110324

3. Abdollahi, A., Pradhan, B. (2023). Explainable artificial intelligence (XAI) for interpreting the contributing factors feed into the wildfire susceptibility prediction model. Science of the Total Environment, 879,163004. DOI: 10.1016/j.scitotenv.2023.163004.

4. Senanayake, S., Pradhan, B.* (2022) Predicting soil erosion susceptibility associated with climate change scenarios in the Central Highlands of Sri Lanka. Journal of Environmental Management, 308, 114589. DOI: 10.1016/j.jenvman.2022.114589

5. Dikshit, A., Pradhan, B.*, Santosh, M. (2022). Artificial neural networks in drought prediction in the 21st century-A scientometric analysis. Applied Soft Computing, 114, 108080. DOI: 10.1016/j.asoc.2021.108080

6. Abdollahi, A., Pradhan, B.*, Alamri, A. (2022). SC-RoadDeepNet: A New Shape and Connectivity-preserving Road Extraction Deep Learning-based Network from Remote Sensing Data. IEEE Transactions on Geoscience and Remote Sensing. DOI: 10.1109/TGRS.2022.3143855

7. Dikshit, A., Pradhan, B.* (2021). Interpretable and explainable AI (XAI) model for spatial drought prediction. Science of the Total Environment, 801, 149797. DOI: 10.1016/j.scitotenv.2021.149797

8. Senanayake S., Pradhan, B.* Huete A., Brennan J. (2021). Proposing an ecologically viable and economically sound farming system using a matrix-based geo-informatics approach. Science of the Total Environment, 794, 148788. DOI: 10.1016/j.scitotenv.2021.148788

9. Naghibi S.A., Hashemi H., Pradhan, B. (2021). APG: A novel python-based ArcGIS toolbox to generate absence-datasets for geospatial studies. Geoscience Frontiers, 12(6), 101232. DOI: 10.1016/j.gsf.2021.101232

10. Abdollahi A., Pradhan, B.* (2021). Integrated technique of segmentation and classification methods with connected components analysis for road extraction from orthophoto images. Expert Systems with Applications, 176, 114908. DOI: 10.1016/j.eswa.2021.114908

11. Abdollahi A., Pradhan, B.* (2021). Urban vegetation mapping from aerial imagery using explainable AI (XAI). Sensors, 21(14), 4738. DOI: 10.3390/s21144738

12. Matin S.S., Pradhan, B.* (2021). Earthquake-induced building-damage mapping using explainable ai (Xai). Sensors, 21(13), 4489. DOI: 10.3390/s21134489

13. Jena R., Pradhan, B.*, Naik S.P., Alamri A.M. (2021) Earthquake risk assessment in NE India using deep learning and geospatial analysis. Geoscience Frontiers, 12(3), 101110. DOI: 10.1016/j.gsf.2020.11.007

14. Dikshit A., Pradhan, B.*, Huete A. (2021). An improved SPEI drought forecasting approach using the long short-term memory neural network. Journal of Environmental Management, 283, 111979, DOI: 10.1016/j.jenvman.2021.111979

15. Al-Najjar H.H., Pradhan, B.* (2021) Spatial landslide susceptibility assessment using machine learning techniques assisted by additional data created with generative adversarial networks. Geoscience Frontiers, 12(2), 625-637 DOI: 10.1016/j.gsf.2020.09.002

16. Pradhan, B., Al-Najjar, H.A.H., Sameen, M.I., Tsang, I., Alamri, A.M. (2020). Unseen Land Cover Classification fromHigh-Resolution Orthophotos Using Integration of Zero-Shot Learning and Convolutional Neural Networks. Remote Sens. 2020, 12, 1676; doi:10.3390/rs12101676

17. Pradhan, B., Al-Najjar, H., Sameen, M.I., Mezaal, M.R., Alamri, AM. (2020). Landslide Detection Using a Saliency Feature Enhancement Technique From LiDAR-Derived DEM and Orthophotos. IEEE Access, 8, pp. 121942 – 121954. DOI: 0.1109/ACCESS.2020.3006914

18. Shukla, N., Pradhan, B., Dikshit, A., Chakraborty, S., & Alamri, A. M. (2020). A Review of Models Used for Investigating Barriers to Healthcare Access in Australia. International Journal of Environmental Research and Public Health, 17(11), 4087.

19. Arabameri, A., Pradhan, B., Bui, D.T. (2020). Spatial modelling of gully erosion in the Ardib River Watershed using three statistical-based techniques. CATENA, 190, 2020, 104545.

20. Noori, A.M., Pradhan, B., Ajaj, Q.M. (2019). Dam site suitability assessment at the Greater Zab River in northern Iraq using remote sensing data and GIS.   Journal of Hydrology, 574, pp. 964-979.

21. Sheikhrahimi, A., Pour, A.B., Pradhan, B., Zoheir, B. (2019). Mapping hydrothermal alteration zones and lineaments associated with orogenic gold mineralization using ASTER data: A case study from the Sanandaj-Sirjan Zone, Iran. Advances in Space Research, 63(10), pp. 3315-3332

22. Daqamseh, S.T., Al-Fugara, A., Pradhan, B., Al-Oraiqat, A., Habib, M. (2019). MODIS derived sea surface salinity, temperature, and chlorophyll-a data for potential fish zone mapping: West red sea coastal areas, Saudi Arabia. Sensors, 19(9), 2069.

23. Javdanian, H., Pradhan, B. (2019). Assessment of earthquake-induced slope deformation of earth dams using soft computing techniques. Landslides, 16(1), pp. 91-103.

24. Fanos, A.M., Pradhan, B. (2019). A novel rockfall hazard assessment using laser

scanning data and 3D modelling in GIS. CATENA, 172, pp. 435-450

25. Lamqadem, A.A., Saber, H., Pradhan, B. (2018). Quantitative assessment of desertification in an arid oasis using remote sensing data and spectral index techniques. Remote Sensing, 10(12),1862

26. Pradhan, B., Rizeei, H.M., Abdulle, A. (2018). Quantitative assessment for detection and monitoring of coastline dynamics with temporal RADARSAT images. Remote Sensing, 10(11),1705

27. Nampak, H., Pradhan, B., Mojaddadi Rizeei, H., Park, H.-J. (2018). Assessment of land cover and land use change impact on soil loss in a tropical catchment by using multitemporal SPOT-5 satellite images and Revised Universal Soil Loss Equation model. Land Degradation and Development, 29(10), pp. 3440-3455

28. Pradhan, B. (2017). Spatial modelling and assessment of urban form: analysis of urban growth: from sprawl to compact using geospatial data. Springer International Publishing, Germany

29. Sameen, M. I., Pradhan, B., Shafri, H. Z., Mezaal, M. R., & bin Hamid, H. (2017). Integration of ant colony optimization and object-based analysis for LiDAR data classification. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 10(5), 2055-2066.

30. Pradhan, B. (2013). A comparative study on the predictive ability of the decision tree, support vector machine and neuro-fuzzy models in landslide susceptibility mapping using GIS', Computers and Geosciences, vol. 51, pp. 350-365.

Biswajeet Pradhan
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