

# Haiping Lu

PRESENT APPOINTMENT	Professor of Machine Learning Head of AI Research Engineering AI Strategy Lead Department of Computer Science Turing Academic Lead Insigneo Healthcare Data/AI Research Director The University of Sheffield	✉ Email: <a href="mailto:h.lu@sheffield.ac.uk">h.lu@sheffield.ac.uk</a> 🌐 Web: <a href="http://haipinglu.github.io">haipinglu.github.io</a> 🔗 Google Scholar: <a href="https://scholar.google.com/citations?user=CArrsDMAAAAJ">CArrsDMAAAAJ</a> 🐙 GitHub: <a href="https://github.com/haipinglu">github.com/haipinglu</a> 🐦 Twitter: <a href="https://twitter.com/haipinglu">twitter.com/haipinglu</a> 📺 YouTube: <a href="https://youtube.com/c/haipinglu">youtube.com/c/haipinglu</a> in LinkedIn: <a href="https://linkedin.com/in/haiping-lu-4821206">linkedin.com/in/haiping-lu-4821206</a>
RESEARCH INTERESTS	◇ Machine learning, multimodal AI, deep learning, tensor factorisation, interpretability ◇ Medical image analysis, graph analysis, bioinformatics, drug discovery, computer vision	
EDUCATION & PROFESSIONAL QUALIFICATION	◇ Fellow of the Higher Education Academy (FHEA), UK, 2018 ◇ PhD in Electrical & Computer Engineering, University of Toronto, Canada, 2008 ◇ MEng in Electrical & Electronic Engineering, Nanyang Technological University, Singapore, 2004 ◇ BEng in Electrical & Electronic Engineering, Nanyang Technological University, Singapore, 2001	
SELECTED AWARDS	◇ Turing Network Development Award 2021, the Alan Turing Institute, UK (as PI). ◇ NIHR AI in Health and Care Award 2020, National Institute for Health Research, UK (as Co-I). ◇ Wellcome Trust Innovator Awards: Digital Technologies 2019, UK (jointly with Swift). ◇ Amazon Research Award 2018: among 83 international awardees. ◇ AAAI-18 Outstanding Program Committee Member Award, Association for the Advancement of Artificial Intelligence, US (20 awardees from 2,415 PC members of AAAI-18). ◇ 2014/15 Early Career Award, Research Grant Council, Hong Kong (22 out of 359). ◇ 2013 IEEE Computational Intelligence Society Outstanding PhD Dissertation Award.	
STUDENT ACHIEVEMENTS	◇ The Fretwell-Downing Prize, for the best MSc dissertation in the Department of Computer Science, University of Sheffield: ▷ 1) Peizhen Bai, 2017; 2) Hao Xu, 2019; 3) Mohammad Naimul Islam Suvon, 2022.	
PROFESSIONAL EXPERIENCE	◇ Professor of Machine Learning, University of Sheffield. (Jan 2023 – present) ◇ Senior Lecturer in Machine Learning, University of Sheffield. (Jan 2020 – Dec 2022) ◇ Lecturer in Machine Learning, University of Sheffield. (Nov 2016 – Dec 2019) ◇ Assistant Professor in Computer Science, Hong Kong Baptist University. (Aug 2013 – Jul 2016) ◇ Scientist, Institute for Infocomm Research, A*STAR, Singapore. (Oct 2009 – Jul 2013) ◇ Post-doctoral fellow, Department of ECE, University of Toronto, Canada. (Sep 2008 – Aug 2009)	
RESEARCH GRANTS	◇ Externally-funded research grants in the UK (Total: GBP 1,687,257) ▷ PI, “Workshop on Multimodal Data Integration”, Turing Network Funding, GBP 10,000, the Alan Turing Institute, UK, Feb 2023 - Jul 2023. ▷ PI, “ <i>An Introduction to Transparent Machine Learning</i> ”, Funding call for online learning courses in responsible AI, GBP 24,919, the Alan Turing Institute, UK, Jul 2022 - Dec 2022. ▷ PI, Turing Network Development Award, GBP 24,964, the Alan Turing Institute, UK, Feb 2022 - Sep 2022. ▷ Co-PI, “Interactively trained ‘human-in-the-loop’ deep learning approach to improve cardiac CT and MRI assessment for accurate therapy response and mortality prediction”, GBP 836,551, Artificial Intelligence in Health and Care Award, NIHR, UK, Mar 2021 - Feb 2023. ▷ Co-PI, “Developing a Machine Learning Tool to Improve Prognostic and Treatment Response Assessment on Cardiac MRI Data”, GBP 639,873, Innovator Awards: Digital Technologies, Wellcome Trust, UK, Oct 2019 - Mar 2022.	

- ▷ PI, “Learning Representations of Higher-Order Structures for Networks via Tensor Embedding”, USD 71,000, Amazon Research Awards, Amazon, US, Apr 2019 - Mar 2020.
- ▷ PI, “Learning Sparse Features from 4D fMRI Data for Brain Disease Diagnosis”, GBP 100,730, First Grant, EPSRC, UK, Jan 2018 - Jun 2019.
- ◇ Externally-funded research grants in Hong Kong (Total: HKD 2,010,203)
  - ▷ PI, “Relaxation Methods in Principal and Discriminative Component Analysis for Tensor Data”, HKD 482,605, 2016/17 General Research Fund, Research Grant Council.
  - ▷ PI, “Learning Independent Components with Tensor-based Modelling for Big fMRI Data”, HKD 695,861, 2015/16 General Research Fund, Research Grant Council.
  - ▷ PI, “Dimensionality Reduction for Learning Correlations between Big Multidimensional Data”, HKD 831,737, 2014/15 Early Career Scheme, Research Grant Council.

PUBLICATIONS ◇ *h*-index: 27; total citations: 4,085; average citations per paper: 42; as of May 24, 2023

◇ **Book**

- [B1] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, “Multilinear Subspace Learning: Dimensionality Reduction of Multidimensional Data”, Chapman & Hall/CRC Press Machine Learning and Pattern Recognition Series, Taylor and Francis, ISBN: 978-1-4398572-4-3, 2013.

◇ **Refereed Journal Papers** [# indicates a supervised student]

- [J35] P. Bai#, F. Miljkovi, B. John, and **H. Lu**, “Interpretable bilinear attention network with domain adaptation improves drug-target prediction”, *Nature Machine Intelligence*, 5, 126-136, 2023.
- [J34] A. Carusi, P. Winter, I. Armstrong, F. Ciravegna, D. Kiely, A. Lawrie, **H. Lu**, I. Sabroe, A. Swift, “Medical artificial intelligence is as much social as it is technological”, *Nature Machine Intelligence*, 5, 98-100, 2023.
- [J33] L. Schöbs#, A. Swift, and **H. Lu**, “Uncertainty Estimation for Heatmap-based Landmark Localization”, *IEEE Transactions on Medical Imaging*, 42(4), 1021-1034, 2023.
- [J32] S. Tabakhi#, M. N. I. Suvon#, P. Ahadian, and **H. Lu**, “Multimodal Learning for Multi-Omics: A Survey”, *World Scientific Annual Review of Artificial Intelligence*, 1, 39 pages, 2023.
- [J31] M. Kunda#, S. Zhou#, G. Gong, and **H. Lu**, “Improving Multi-Site Autism Classification via Site-Dependence Minimization and Second-Order Functional Connectivity”, *IEEE Transactions on Medical Imaging*, 42(1), 55-65, 2023.
- [J30] H. Xu#, S. Sang, P. Bai#, R. Li#, L. Yang, and **H. Lu**, “GripNet: Graph Information Propagation on Supergraph for Heterogeneous Graphs”, *Pattern Recognition*, 133, 108973, 2023.
- [J29] L. Zhang#, H. Song, N. Aletras, and **H. Lu**, “Node-Feature Convolution for Graph Convolutional Networks”, *Pattern Recognition*, 128, 108661, 2022.
- [J28] L. Song#, S. Zhou#, and **H. Lu**, “Direct ICA on Data Tensor via Random Matrix Modeling”, *Signal Processing*, <https://doi.org/10.1016/j.sigpro.2022.108508>, 2022.
- [J27] S. Alabed#, A. Maiter, M. Salehi, A. Mahmood, S. Daniel, S. Jenkins, M. Goodlad, M. Sharkey, M. Mamalakis, V. Rakocevic, K. Dwivedi#, H. Assadi, J. Wild, **H. Lu**, D. O'Regan, R. van der Geest, P. Garg, A. J Swift, “Quality of reporting in AI cardiac MRI segmentation studies: A systematic review and recommendations for future studies”. *Frontiers in Cardiovascular Medicine*, <https://doi.org/10.3389/fcvm.2022.956811>, 2022.
- [J26] S. Alabed#, J. Uthoff#, S. Zhou#, P. Garg, K. Dwivedi#, F. Alandejani, R. Gosling, L. Schöbs#, M. Brook, D. Capener, C. Johns, J. M Wild, A. Rothman, R. Geest, R. Condliffe, D. Kiely, **H. Lu**, A. Swift, “Machine learning cardiac-MRI features predict mortality in newly diagnosed pulmonary arterial hypertension”. *European Heart Journal-Digital Health*, <https://doi.org/10.1093/ehjdh/ztac022>, 2022.
- [J25] S. Alabed#, F. Alandejani, K. Dwivedi#, K. Karunasaagarar, M. Sharkey, P. Garg, P. Koning, A. Tóth, Y. Shahin, C. Johns, M. Mamalakis, S. Stott, D. Capener, S. Wood, P. Metherall, A. Rothman, R. Condliffe, N. Hamilton, J. Wild, D. O'Regan, **H. Lu**, D. Kiely, R. Geest, A. Swift, “Validation of Artificial Intelligence Cardiac MRI Measurements: Relationship to Heart Catheterization and Mortality Prediction”. *Radiology*, <https://doi.org/10.1148/radiol.212929>, 2022.
- [J24] F. Alandejani, S. Alabed#, P. Garg, Z. M. Goh, K. Karunasaagarar, M. Sharkey, M. Salehi, Z. Aldabagh, K. Dwivedi#, M. Mamalakis, P. Metherall, J. Uthoff#, C. Johns, A. Rothman, R. Condliffe, A. Hameed, A. Charalampopoulos, **H. Lu**, S. Plein, J. Greenwood, A. Lawrie, J. Wild, P. Koning, D. Kiely, R. Geest, A. Swift, “Training and clinical testing of artificial intelligence derived right atrial cardiovascular magnetic resonance measurements”. *Journal of Cardiovascular Magnetic Resonance*, 24(1), 1-11, 2022.

- [J23] K. Dwivedii#, R. Condliffe, M. Sharkey, R. Lewis, S. Alabed#, S. Rajaram, C. Hill, L. Saunders, P. Metherall, F. Alandejani, D. Alkhanfar, J. Wild, **H. Lu**, D. Kiely, A. J. Swift, "Computed tomography lung parenchymal descriptions in routine radiological reporting have diagnostic and prognostic utility in patients with idiopathic pulmonary arterial hypertension and pulmonary hypertension associated with lung disease", *ERJ Open Research*, 8: 00549-2021, 2022.
- [J22] Y. Ge#, P. Peng, and **H. Lu**, "Mixed-Order Spectral Clustering for Networks", *Pattern Recognition*, 117, 107964, 2021.
- [J21] K. Dwivedii#, M. Sharkey, J. Uthoff#, S. Alabed#, P. Metherall, **H. Lu**, R. Condliffe, J. Wild, E. Hoffman, A. J. Swift, D. Kiely, "Pulmonary Hypertension in Association with Lung Disease: Quantitative CT and Artificial Intelligence to the Rescue? State-of-the-Art Review", *Diagnostics*, 11(4), 679, 2021.
- [J20] M. Schirmer, A. Venkataraman, I. Rekik, M. Kim, S. Mostofsky, M. Nebel, K. Rosch, K. Seymour, D. Crocetti, H. Irzan, M. Hütel, S. Ourselin, N. Marlow, A. Melbourne, E. Levchenko, S. Zhou#, M. Kunda#, **H. Lu**, N. C Dvornek, J. Zhuang, G. Pinto, S. Samal, J. Bernal-Rusiel, R. Pienaar, A. W. Chung, "Neuropsychiatric Disease Classification Using Functional Connectomics—Results of the Connectomics in NeuroImaging Transfer Learning Challenge", *Medical Image Analysis*, 70, 101972, 2021.
- [J19] A. J Swift\*, **H. Lu**\*, J. Uthoff#, P. Garg, M. Coglianò, J. Taylor, P. Metherall, S. Zhou#, C. S Johns, S. Alabed#, R. Condliffe, A. Lawrie, J. Wild and D. Kiely, "A Machine-Learning CMR Approach to Extract Disease Features and Automate Pulmonary Arterial Hypertension Diagnosis", *European Heart Journal - Cardiovascular Imaging*, 22(2), 236–245, 2021. \*joint first author
- [J18] Y. Zhou#, **H. Lu**, and Y.-M. Cheung, "Probabilistic Rank-One Tensor Analysis with Concurrent Regularizations", *IEEE Trans. on Cybernetics*, 51(7), 3496-3509, 2021.
- [J17] P. Bai#, Y. Ge#, F. Liu#, and **H. Lu**, "Joint Interaction with Context Operation for Collaborative Filtering", *Pattern Recognition*, 88, 729-738, 2019.
- [J16] Q. Shi#, Y. M. Cheung, Q. Zhao, and **H. Lu** "Feature Extraction for Incomplete Data via Low-rank Tensor Decomposition with Feature Regularization", *IEEE Trans. on Neural Networks and Learning Systems*, 30(6), 1803-1817, 2019.
- [J15] Q. Shi#, **H. Lu** and Y. M. Cheung, "Rank-One Matrix Completion with Automatic Rank Estimation via L1-Norm Regularization", *IEEE Trans. on Neural Networks and Learning Systems*, 29(10), 4744-4757, 2018.
- [J14] X. Xie, Z.-L. Yu, **H. Lu**, Z. Gu and Y. Li, "Motor Imagery Classification based on Bilinear Sub-Manifold Learning of Symmetric Positive-Definite Matrices", *IEEE Trans. on Neural Systems & Rehabilitation Engineering*, 25(6), 504-516, 2017.
- [J13] **H. Lu**, Y. Pan, B. Mandal, H.-L. Eng, C. Guan and D. W. S. Chan, "Quantifying Limb Movements in Epileptic Seizures through Color-based Video Analysis", *IEEE Trans. on Biomedical Engineering*, 60(2), 461-469, 2013.
- [J12] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "A Survey of Multilinear Subspace Learning for Tensor Data", *Pattern Recognition*, 44(7), 1540-1551, 2011.
- [J11] **H. Lu**, H.-L. Eng, C. Guan, K. N. Plataniotis and A. N. Venetsanopoulos, "Regularized Common Spatial Pattern With Aggregation for EEG Classification in Small-Sample Setting", *IEEE Trans. on Biomedical Engineering*, 57(12), 2936-2946, 2010.
- [J10] F. Bui, K. Martin, **H. Lu**, K. N. Plataniotis and D. Hatzinakos, "Fuzzy Key Binding Strategies Based on Quantization Index Modulation (QIM) for Biometric Encryption (BE) Applications", *IEEE Trans. on Information Forensics and Security*, 5(1), 118-132, 2010.
- [J9] K. Martin, **H. Lu**, F. Bui, K. N. Plataniotis and D. Hatzinakos, "A Biometric Encryption System for the Self-Exclusion Scenario of Face Recognition", *IEEE Systems Journal*, 3(4), 440-450, 2009.
- [J8] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Uncorrelated Multilinear Principal Component Analysis for Unsupervised Multilinear Subspace Learning", *IEEE Trans. on Neural Networks*, 20(11), 1820-1836, 2009.
- [J7] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Boosting Discriminant Learners for Gait Recognition using MPCA Features", *EURASIP Journal on Image and Video Processing*, 2009, 713183, 2009.
- [J6] J. Wang, **H. Lu**, K. N. Plataniotis and J. Lu, "Gaussian Kernel Optimization for Pattern Classification", *Pattern Recognition*, 42(7), 1237-1247, 2009.
- [J5] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Uncorrelated Multilinear Discriminant Analysis with Regularization and Aggregation for Tensor Object Recognition", *IEEE Trans. on Neural Networks*, 20(1), 103-123, 2009.
- [J4] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "MPCA: Multilinear Principal Component Analysis of Tensor Objects", *IEEE Trans. on Neural Networks*, (19), (1), 18-39, Jan. 2008.

- [J3] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "A Full-Body Layered Deformable Model for Automatic Model-Based Gait Recognition", *EURASIP Journal on Advances in Signal Processing*, 2008, 261317, 2008.
- [J2] **H. Lu**, Y. Q. Shi, A. C. Kot and L. Chen, "Binary Image Watermarking through Blurring and Biased Binarization", *International Journal of Image and Graphics*, 5(1), 67-87, 2005.
- [J1] **H. Lu**, A. C. Kot and Y. Q. Shi, "Distance-Reciprocal Distortion Measure for Binary Document Images", *IEEE Signal Processing Letters*, 11(2), 228-231, 2004.

◇ **Refereed Conference Papers** [# indicates a supervised student/staff]

- [C38] M. N. I. Suvon#, P. C. Tripathi#, S. Alabed#, A. Swift, and **H. Lu**, "Multimodal Learning for Predicting Mortality in Patients with Pulmonary Arterial Hypertension", in *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine (BIBM 2022)*, pages 2704-2710, December 6-8, 2022.
- [C37] **H. Lu**, X. Liu#, S. Zhou#, R. Turner, P. Bai#, R. Koot#, M. Chasmai#, L. Schobs#, and H. Xu#, "PyKale: Knowledge-Aware Machine Learning from Multiple Sources in Python", in *Proceedings of the 31st ACM Conference on Information and Knowledge Management (CIKM 2022)*, Atlanta, Georgia, USA, Pages. 42744278, October 17-21, 2022.
- [C36] S. Tabakhi# and **H. Lu**, "Multi-agent Feature Selection for Integrative Multi-omics Analysis", in *Proceedings of the 44th Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'22)*, Glasgow, UK, July 11-15, 2022.
- [C35] L. Zhang#, L. Shi, J. Zhao, J. Yang, T. Lyu, D. Yin, and **H. Lu**, "A GNN-based Multi-task Learning Framework for Personalized Video Search", in *Proceedings of the Fifteenth International Conference on Web Search and Data Mining (WSDM 2022)*, February 21-25, 2022.
- [C34] A. Herghelegiu# and **H. Lu**, "Improving Negative Sampling in Graph Neural Networks for Predicting Drug-Drug Interactions", in *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine (BIBM 2021)*, pages 3728-3735, December 9-12, 2021.
- [C33] P. Bai#, F. Miljkovi, Y. Ge#, N. Greene, B. John, and **H. Lu**, "Hierarchical Clustering Split for Low-Bias Evaluation of Drug-Target Interaction Prediction", in *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine (BIBM 2021)*, pages 641-644, December 9-12, 2021.
- [C32] L. Schobs#, S. Zhou#, M. Coglianò, A. Swift, and **H. Lu**, "Confidence-quantifying landmark localisation for cardiac MRI", in *Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI 2021)*, April 13-16, 2021.
- [C31] L. Zhang#, and **H. Lu**, "A Feature-Importance-Aware and Robust Aggregator for GCN", in *Proceedings of the 29th ACM Conference on Information and Knowledge Management (CIKM 2020)*, Galway, Ireland, Pages. 1813-1822, October 19-23, 2020.
- [C30] J. Uthoff#, S. Alabed#, A. Swift, and **H. Lu**, "Geodesically Smoothed Tensor Features for Pulmonary Hypertension Prognosis using the Heart and Surrounding Tissues", in *Proceedings of the 23rd International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2020)*, Lima, Peru, pages. 253-262, October 04-08, 2020.
- [C29] S. Zhou#, W. Li#, C. Cox, and **H. Lu**, "Side Information Dependence as a Regularizer for Analyzing Human Brain Conditions across Cognitive Experiments", in *Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI 2020)*, New York, New York, USA. Pages. 6957-6964, February 07-12, 2020.
- [C28] Q. Shi#, **H. Lu** and Y. M. Cheung, "Tensor Rank Estimation and Completion via CP-based Nuclear Norm", in *Proceedings of the 26th ACM Conf. on Information and Knowledge Management (CIKM 2017)*, Singapore, Pages 949-958, November 06-10, 2017.
- [C27] Y. Zhou#, **H. Lu** and Y. M. Cheung, "Bilinear Probabilistic Canonical Correlation Analysis via Hybrid Concatenations", in *Proceedings of the 31st AAAI Conf. on Artificial Intelligence (AAAI 2017)*, San Francisco, U.S., Pages 2949-2955, February 04-09, 2017.
- [C26] X. Song# and **H. Lu**, "Multilinear Regression for Embedded Feature Selection with Application to fMRI Analysis", in *Proceedings of the 31st AAAI Conf. on Artificial Intelligence (AAAI 2017)*, San Francisco, U.S., Pages 2562-2568, February 04-09, 2017.
- [C25] L. Song# and **H. Lu**, "Proper Inner Product with Mean Displacement for Gaussian Noise Invariant ICA", in *Proceedings of the 8th Asian Conf. on Machine Learning, Hamilton (ACML 2016)*, Hamilton, New Zealand, Pages 398-413, November 16-18, 2016.
- [C24] L. Song# and **H. Lu**, "EcoICA: Skewness-based ICA via Eigenvectors of Cumulant Operator", in *Proceedings of the 8th Asian Conf. on Machine Learning, Hamilton (ACML 2016)*, Hamilton, New Zealand, Pages 445-460, November 16-18, 2016.

- [C23] Y. Zhou# and **H. Lu**, "Probabilistic Rank-One Matrix Analysis with Concurrent Regularization", in *Proceedings of the 25th International Joint Conf. on Artificial Intelligence (IJCAI 2016)*, New York City, U.S., Pages 2428-2434, July 09-15, 2016.
- [C22] **H. Lu**, J. Wu, and Y. Zhang "Learning Compact Binary Codes from Higher-Order Tensors via Free-Form Reshaping and Binarized Multilinear PCA", in *Proceedings of the 2016 International Joint Conf. on Neural Networks (IJCNN 2016)*, Vancouver, Canada, Pages 3008-3015, July 24-29, 2016.
- [C21] X. Song#, L. Meng#, Q. Shi# and **H. Lu**, "Learning Tensor-Based Features for Whole-Brain fMRI Classification", in *Proceedings of the 18th Int. Conf. on Medical Image Computing and Computer Assisted Intervention (MICCAI 2015)*, Munich, Germany, Pages 613-620, October 05-09, 2015.
- [C20] Q. Shi# and **H. Lu**, "Semi-Orthogonal Multilinear PCA with Relaxed Start", in *Proceedings of the 24th International Joint Conf. on Artificial Intelligence (IJCAI 2015)*, Buenos Aires, Argentina, Pages 3805-3811, July 25-31, 2015.
- [C19] **H. Lu**, "Learning Modewise Independent Components from Tensor Data Using Multilinear Mixing Model", in *Proceedings of the European Conf. on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD2013)*, Prague, Czech Republic, Pages 288-303, September 23-27, 2013.
- [C18] **H. Lu**, "Learning Canonical Correlations of Paired Tensor Sets via Tensor-to-Vector Projection", in *Proceedings of the 23rd International Joint Conf. on Artificial Intelligence (IJCAI 2013)*, Beijing, China, Pages 1516-1522, August 3-9, 2013.
- [C17] B. Mandal, H.-L. Eng, **H. Lu**, D. W. S. Chan and Y.-L. Ng, "Non-intrusive Head Movement Analysis of Videotaped Seizures of Epileptic Origin", in *Proceedings of the 34th Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'12)*, San Diego, California, Pages 6060-6063, 28th Aug.-1st Sep., 2012.
- [C16] **H. Lu**, H.-L. Eng, B. Mandal, D. W. S. Chan and Y.-L. Ng, "Markerless Video Analysis for Movement Quantification in Pediatric Epilepsy Monitoring", in *Proceedings of the 33rd Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'11)*, Boston, Massachusetts, USA, Pages 8275-8278, 30th Aug.-3rd Sep., 2011.
- [C15] **H. Lu**, H.-L. Eng, M. Thida, and K.N. Plataniotis, "Visualization and Clustering of Crowd Video Content in MPCA Subspace", in *Proceedings of the 19th ACM Conf. on Information and Knowledge Management (CIKM 2010)*, Toronto, ON, Canada, Pages 1777-1780, Oct., 2010.
- [C14] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Regularized Common Spatial Patterns with Generic Learning for EEG Signal Classification", in *Proceedings of the 31st Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'09)*, Minneapolis, Minnesota, USA, Pages 6599-6602, Sep. 2009.
- [C13] **H. Lu**, K. Martin, F. Bui, K. N. Plataniotis and D. Hatzinakos, "Face recognition with biometric encryption for privacy-enhancing self-exclusion", in *Proceedings of the 16th Int. Conf. on Digital Signal Processing (DSP 2009)*, Santorini, Greece, Jul. 2009.
- [C12] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Uncorrelated Multilinear Principal Component Analysis through Successive Variance Maximization", in *Proceedings of the 25th Int. Conf. on Machine Learning (ICML 2008)*, Helsinki, Finland, Pages 616-623, Jul. 2008.
- [C11] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Boosting LDA with Regularization on MPCA Features for Gait Recognition", in *Proceedings of the Biometrics Symposium 2007 (BSYM 2007)*, Baltimore, USA, Sep. 2007. doi:10.1109/BCC.2007.4430542.
- [C10] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Uncorrelated Multilinear Discriminant Analysis with Regularization for Gait Recognition", in *Proceedings of the Biometrics Symposium 2007 (BSYM 2007)*, Baltimore, USA, Sep. 2007.
- [C9] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Gait Recognition through MPCA plus LDA", in *Proceedings of the Biometrics Symposium 2006 (BSYM 2006)*, Baltimore, USA, Sep. 2006.
- [C8] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Multilinear Principal Component Analysis of Tensor Objects for Recognition", in *Proceedings of the Int. Conf. on Pattern Recognition (ICPR 2006)*, Hong Kong, China, Vol. 2, Pages 776-779, Aug. 2006.
- [C7] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "Coarse-to-Fine Pedestrian Localization and Silhouette Extraction for the Gait Challenge Data Sets", in *Proceedings of the IEEE Int. Conf. on Multimedia & Expo (ICME 2006)*, Toronto, Canada, Pages 1009-1012, Jul. 2006.
- [C6] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "A Layered Deformable Model for Gait Analysis", in *Proceedings of the IEEE Int. Conf. on Automatic Face and Gesture Recognition (FG 2006)*, Southampton, UK, Pages 249-254, Apr. 2006.

- [C5] **H. Lu**, A. C. Kot and R. Susanto, "Binary Image Watermarking through Biased Binarization", in *Proceedings of the 2003 IEEE Int. Conf. on Multimedia & Expo (ICME 2003)*, Baltimore, Maryland, USA, Vol. 3, Pages 101-104, Jul. 2003.
- [C4] **H. Lu**, A. C. Kot and J. Cheng, "Secure Data Hiding in Binary Document Images for Authentication", in *Proceedings of the 2003 IEEE International Symposium on Circuits and Systems (ISCAS 2003)*, Bangkok, Thailand, Vol. 3, Pages 806-809, May 2003.
- [C3] **H. Lu**, X. Shi, Y. Q. Shi, A. C. Kot and L. Chen, "Watermark Embedding in DC Components of DCT for Binary Images", in *Proceedings of the IEEE International Workshop on Multimedia Signal Processing (MMSP 2002)*, US Virgin Islands, Pages 300-303, Dec. 2002.
- [C2] **H. Lu**, X. Jiang and W. Y. Yau, "Effective and Efficient Fingerprint Image Postprocessing", in *Proceedings of the Seventh Int. Conf. on Control, Automation, Robotics and Vision (ICARCV 2002)*, Singapore, Pages 985-989, Dec. 2002.
- [C1] **H. Lu**, J. Wang, A. C. Kot and Y. Q. Shi, "An Objective Distortion Measure for Binary Document Images Based on Human Visual Perception", in *Proceedings of the 16th Int. Conf. on Pattern Recognition (ICPR 2002)*, Quebec City, Canada, Vol. 4, Pages 239-242, Aug. 2002.

◇ **Book Chapters**

- [BC2] **H. Lu**, K. N. Plataniotis and A. N. Venetsanopoulos, "A Taxonomy of Emerging Multilinear Discriminant Analysis Solutions for Biometric Signal Recognition", in *Biometrics: Theory, Methods, and Applications*, N. Boulgouris, K. N. Plataniotis, and E. Micheli-Tzanakou, Eds., Pages 21-45, Wiley-IEEE Press, ISBN: 978-0-470-24782-2, 2009.
- [BC1] **H. Lu**, J. Wang and K. N. Plataniotis, "A Review on Face and Gait Recognition: System, Data and Algorithms", in *Advanced Signal Processing: Theory and Implementation for Sonar, Radar, and Non-Invasive Medical Diagnostic Systems, Second Edition*, S. Stergiopoulos, Editor, Pages 303-330, CRC Press, Boca Raton, Florida, ISBN: 978-1-4200-6238-0, 2009.

◇ **Patent**

- [P2] **H. Lu** and A. Swift, "Medical Image Processing", United States Patent Application, US 2021/0383547 A1, published 09 Dec 2021.
- [P1] A. C. Kot, H. Yang and **H. Lu**, "Method, Software and Device for Hiding Data in Binary Images While Preserving Image Quality", United States Patent 7,324,662, January 29, 2008.

STUDENT AND  
STAFF  
SUPERVISION

- ◇ Principal supervisor of post-doctoral researchers, the University of Sheffield.
  - ▷ Prasun Chandra Tripathi, July 2022 – present.
  - ▷ Johanna Uthoff, October 2019 – September 2021.
  - ▷ Wenwen Li, June 2018 – August 2019.
- ◇ Principal supervisor of visiting researchers, the University of Sheffield.
  - ▷ Xianyuan Liu, September 2019 – September 2021.
- ◇ Principal supervisor of PhD students, the University of Sheffield.
  - ▷ Sina Tabakhi, from November 2021
  - ▷ Pawel Pukowski, from November 2021
  - ▷ Peizhen Bai, from January 2021
  - ▷ Lawrence Schobs, from September 2019
  - ▷ Shuo Zhou, "Interpretable Domain-Aware Learning for Neuroimage Classification", completed in May 2022, now an Academic Fellow at University of Sheffield
  - ▷ Li Zhang, "Exploring Local Information for Graph Representation Learning", completed in February 2022, now a Postdoctoral Research Associate at University of Oxford
  - ▷ Yan Ge, "Representation Learning with Motif Structures", completed in August 2021, now a Lecturer at University of Bristol
- ◇ Co-supervisor of PhD students, the University of Sheffield.
  - ▷ Ludmila Kucikova, from October 2021
  - ▷ Krit Dwivedi, from October 2020.
  - ▷ Samer Al-Abed, completed in 2022.
- ◇ Principal supervisor of two PhD students, Hong Kong Baptist University (HKBU).

- ▷ Yang Zhou, completed in 2019.
- ▷ Qiquan Shi, completed in 2018.
- ◇ Supervisor of two research assistants, HKBU.
  - ▷ Liyan Song, from November 2015 to July 2016.
  - ▷ Xiaonan Song, from January 2015 to August 2015.

RELEASED  
SOFTWARE

60,000+ downloads in total:

- [S4] Machine learning library: [github.com/pykale/pykale](https://github.com/pykale/pykale), part of the PyTorch ecosystem
- [S3] GitHub: <https://github.com/haipinglu>
- [S2] MATLAB Central: [www.mathworks.com/matlabcentral/fileexchange/authors/80417](https://www.mathworks.com/matlabcentral/fileexchange/authors/80417)
- [S1] Machine Learning Open Source Software: [mloss.org/software/author/haiping-lu/](https://mloss.org/software/author/haiping-lu/)

## MEDIA COVERAGE

- [M6] The National Centre for Universities and Business (NCUB) - Artificial Intelligence: the present and future of technology: Understanding the effectiveness of new drugs (one of eight selected), Spring 2023 Edition.
- [M5] The Times (special supplement on the future of data and AI): How in silico testing is accelerating drug R&D, 22nd March 2023.
- [M4] Pan European Networks Ltd (pharma portal): Using AI to accelerate drug discovery, 3rd February 2023.
- [M3] Pharmafile.com (pharma portal): DrugBAN AI expected to reduce costs and speed up drug discovery, 3rd February 2023.
- [M2] The Engineer (UK magazine): DrugBAN AI could cut costs and accelerate drug discovery, 3rd February 2023.
- [M1] The Yorkshire Post (UK newspaper): Team uses AI to produce life-saving treatments, 3rd February 2023.

## SELECTED TALKS

- [T13] "AI Research Engineering for Multimodal AI", Insigneo Showcase, University of Sheffield, July 2023.
- [T12] "AI Research Engineering for Multimodal AI", Engineering Research Symposium 2023, University of Sheffield, June 2023.
- [T11] "Learning across Domains and Modalities for Drug Discovery", AstraZeneca, May 2023.
- [T10] "PyKale: Knowledge-Aware Machine Learning from Multiple Sources in Python", the Alan Turing Institute, February 2023.
- [T9] "Learning from healthcare data across domains and modalities", Advances in Data Science and AI seminar series, University of Manchester, February 2023.
- [T8] "Learning Relationships on Multimodal and Cross-Domain Data for Drug Discovery", Healx, August 2022.
- [T7] Insigneo Showcase, "AI Strategy and Turing Network Development", Sheffield, July 2022.
- [T6] "PyKale: Knowledge-Aware Machine Learning from Multiple Sources in Python", Shenyang Institute of Automation, University of the Chinese Academy of Sciences, September 2021.
- [T5] Insigneo Showcase (>200 delegates), "Interpretable Machine Learning", Sheffield, May 2019.
- [T4] Oxford BDI Seminar, "Interpretable Machine Learning with Tensor Models for Healthcare", the Big Data Institute (BDI), University of Oxford, April 2019.
- [T3] "Tensor Analysis and Learning for Medical Data", ECE Seminar, Brunel University, UK, May 2018.

[T2] “Tensor Analysis and Learning”, Artificial Intelligence and Natural Computation Seminars, University of Birmingham, UK, December 2017.

[T1] “The Birth of My First Proposal”, experience sharing on proposal preparation, one of the two speakers nominated by the Research Grant Council Engineering Panel Chair, *Research Grant Council Town Hall Meeting on Submission of Individual Research Proposals*, December 10, 2015.

## PROFESSIONAL SERVICES

- ◇ Research and Innovation Advisory Committee, the Alan Turing Institute, from April 2023.
- ◇ Turing Academic Lead at Sheffield, from April 2023.
- ◇ Turing Network Development Award Lead at Sheffield, Feb 2022 – March 2023.
- ◇ Primary (lead) organiser, Turing Interest Group on Meta-learning for multimodal data, from October 2022.
- ◇ Insigneo Research Director for Healthcare Data / AI, University of Sheffield, from November 2021.
- ◇ Machine Learning Theme Lead for Sheffield in the N8 Centre of Excellence in Computationally Intensive Research, University of Sheffield, from December 2021.
- ◇ AI Strategy Lead, Department of Computer Science, University of Sheffield, from March 2021.
- ◇ Associate Editor:
  - ▷ IEEE Transactions on Neural Networks and Learning Systems (TNNLS), from Jan 2022.
  - ▷ IEEE Transactions on Cognitive and Developmental Systems (TCDS), from Jan 2022.
  - ▷ World Scientific Annual Review of Artificial Intelligence, from July 2021.
- ◇ Area Chair:
  - ▷ International Joint Conf. on Artificial Intelligence (IJCAI): 2021.
- ◇ Senior Program Committee Member:
  - ▷ AAAI Conf. on Artificial Intelligence (AAAI): 2019, 2020, 2022.
  - ▷ International Joint Conf. on Artificial Intelligence (IJCAI): 2018, 2019, 2022.
- ◇ Session Chair:
  - ▷ The 44th International Engineering in Medicine and Biology Conference (EMBC): 2022.
  - ▷ The 31st AAAI Conf. on Artificial Intelligence (AAAI): 2017.
- ◇ Program Committee Member: ICML, NeurIPS, AAAI, IJCAI, AISTATS
- ◇ Organising Committee Member, Semantic Web Challenge: Mining HTML-embedded Product Data at International Semantic Web Conference 2020.
- ◇ Member of the IEEE Computational Intelligence Society Subcommittee for Outstanding PhD Dissertation Award, 2014, 2015.
- ◇ Grant proposal reviewer
  - ▷ Natural Sciences and Engineering Research Council, Canada, 2019 and 2021
  - ▷ National Institute for Health Research (NIHR), UK, 2021.
  - ▷ The Biotechnology and Biological Sciences Research Council (BBSRC), UK, 2018 and 2021.
  - ▷ The Engineering and Physical Sciences Research Council (EPSRC), UK, 2018 and 2022.
  - ▷ The Medical Research Council (MRC), UK, 2018 and 2022.
  - ▷ Wellcome Trust, UK, 2019
  - ▷ French National Research Agency, 2020
  - ▷ Irish Research Council, 2017 and 2022.
  - ▷ Romanian National Council for Scientific Research, 2012.
- ◇ Book endorsement: Cambridge University Press, 2022
- ◇ Book Reviewer: Cambridge University Press, 2018, 2020, 2021



## ◇ PhD Examination

- ▷ Rui Qin, Department of Computer Science, University of Manchester, July 2022.
- ▷ Michail Mamalakis, Department of Computer Science, University of Sheffield, September 2021.
- ▷ Guozhong Li, Department of Computer Science, Hong Kong Baptist University, August 2021.

PROFESSIONAL  
MEMBERSHIPS

- ◇ Senior Member, the Institute of Electrical and Electronic Engineers (IEEE).
  - ▷ IEEE Computational Intelligence Society
  - ▷ IEEE Engineering in Medicine and Biology Society

## TEACHING

- ◇ Instructor, Alan Turing Institute.
  - ▷ An Introduction to Transparent Machine Learning, part of the Alan Turing Institutes online learning courses in responsible AI.
- ◇ Instructor, Department of Computer Science, the University of Sheffield.
  - ▷ COM6012 - Scalable Machine Learning: Spring 2017 – present.
  - ▷ COM4509/COM6509 - Machine Learning and Adaptive Intelligence, Fall 2018–2021.
- ◇ Instructor, Department of Computer Science, Hong Kong Baptist University.
  - ▷ COMP1320/2006 - Computer Organization: Fall 2014, Fall 2015.
  - ▷ COMP2230/3005 - Design and Analysis of Algorithms: Spring 2014, Fall 2014.
  - ▷ COMP3090/4075 - Introduction to Web Intelligence/Social Computing and Web Intelligence: Fall 2013, Fall 2014, Fall 2015.
  - ▷ COMP3110/4027/7650 - Data Mining and Knowledge Discovery: Spring 2015.
  - ▷ COMP7630 - Web Intelligence and Its Applications: Fall 2013, Fall 2014, Fall 2015.

*Date of the latest update: May 24, 2023*