Andrew S. Lan

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Curriculum Vitae

Research interests

Primary: Machine learning methods for personalized learning in education

Secondary: Convex optimization; Bayesian data analysis; Reinforcement learning; Social network analysis; Deep learning

Education

2016: Ph.D. in Electrical and Computer Engineering, Rice University, Houston, TX, USA. Doctoral dissertation: "Machine Learning Techniques for Personalized Learning," thesis advisor: Prof. Richard G. Baraniuk.

2014: M.S. in Electrical and Computer Engineering, Rice University, Houston, TX, USA. Master's thesis: "Sparse Factor Analysis for Learning and Content Analytics," thesis advisor: Prof. Richard G. Baraniuk.

2010: B.S. in Physics and Mathematics with minor in Information Technology (first class honors), Hong Kong University of Science and Technology, Hong Kong.

Academic positions

2019–now: Assistant Professor, College of Information and Computer Sciences, University of Massachusetts Amherst, Amherst, MA, USA.

2017–2018: Postdoctoral Research Associate in the Department of Electrical Engineering, Princeton University, Princeton, NJ, USA. Advisors: Prof. Mung Chiang and Prof. H. Vincent Poor.

Selected Sponsored Projects

1. NSF DRL-2418657, Collaborative Research: Comprehensive Personalized Programming Practice Environment, 09/01/2024–08/31/2027
2. NSF DRL-2341948, Using Artificial Intelligence to Personalize Mathematics Instruction to Students Interests, 08/01/2024–07/31/2028
3. NSF DRL-2153481, Mid-scale RI-2: A National Research Infrastructure for Large-Scale Learning Science and Engineering, 05/01/2024–10/31/2028
4. Schmidt Futures 2023-10-18-4, Large language model (LLM) methodology hub for the learning engineering virtual institute (LEVI), 11/01/2023–10/30/2024

5. NSF IIS-2237676, CAREER: Generative Item, Response, and Feedback Models in Assessment and Learning, 05/15/2023–04/30/2028
6. Rockefeller Philanthropy Advisors, G-22-2130254, RAISE+: Rice Algebra Initiative for Equity & Success as part of the learning engineering virtual institute (LEVI), 10/03/2022–05/31/2025
7. NSF IIS-2202506, Collaborative Research: Collaborative Research: STEM Learning Embedded in a Machine-in-the-Loop Collaborative Story Writing Game, 09/01/2022–08/30/2025
8. NSF IUSE-2215193, Collaborative Research: Evident: An Educational Tool for Teaching and Learning Concurrent Computer Programming Techniques, 07/01/2022–06/30/2025
9. IES R305N210064, Efficient Education Research via the OpenStax Learning Platform, 09/01/2021–08/30/2026
10. NSF IIS-2118706, Collaborative Research: Common Error Diagnostics and Support in Short-answer Math Questions, 10/01/2021–09/30/2024
11. NSF CA-FW-HTF-1936915, RAISE: C-Accel Pilot-Track B1:DIRECT: A Framework for Diagnosis, Recommendation, and Training in Continuous Workforce Development, 09/01/2019–05/31/2021
12. NSF IIS-1917713, Collaborative Research: Student Affect Detection and Intervention with Teachers in the Loop, 09/01/2019–08/31/2023

Selected Awards

1. Grand prize winner, ED.gov National Assessment of Educational Progress (NAEP) Automated Scoring Challenge, Math Automated Scoring Challenge
2. Learning engineering tools competition, 2024
3. Track 4 winner and overall third place, NeurIPS 2020 Education Challenge
4. Best student paper award, IEEE Big Data 2020, AIED 2024
5. Best paper nominee, ACM LAK 2021
6. NSF Career Compass Challenge Phase 1, 2019

International Collaborations

This section is dedicated to the conflict of interest (COI) declarations to not get myself into trouble with US regulations.

- Collaborator: Eedi (UK), collaboration: data sharing and research discussions
- Collaborator: University of Auckland, PeerWise (NZ), collaboration: data sharing
- Collaborator: National Institute of Education at Nanyang Technology University (SG), collaboration: data sharing

Professional activities

- Workshops organized:
  - International Conference on Artificial Intelligence in Education (AIED), Tokyo, Japan, July 2023, on "Intelligent Textbooks" (with Prof. S. Sosnovsky and Prof. P. Brusilovsky)
  - International Conference on Artificial Intelligence in Education (AIED), Online, July 2022, on "Intelligent Textbooks" (with Prof. S. Sosnovsky and Prof. P. Brusilovsky)
  - International Conference on Artificial Intelligence in Education (AIED), Online, June 2021, on "Intelligent Textbooks" (with Prof. S. Sosnovsky and Prof. P. Brusilovsky)
  - International Conference on Educational Data Mining (EDM), Online, July 2020, on "Fairness and Transparency in Educational Data Mining" (with many others)
  - International Conference on Artificial Intelligence in Education (AIED), Online, July 2020, on "Intelligent Textbooks" (with Prof. S. Sosnovsky, Prof. P. Brusilovsky, and Prof. R. G. Baraniuk)
  - ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Anchorage, AK, Aug. 2019, on "Deep Learning for Education" (with Dr. B. Kim, Prof. M. C. Mozer, Prof. R. G. Baraniuk, and Prof. J. Whitehill)
  - International Conference on Artificial Intelligence in Education (AIED), Chicago, IL, June 2019, on "Intelligent Textbooks" (with Prof. S. Sosnovsky, Prof. P. Brusilovsky, Prof. R. G. Baraniuk, and Dr. R. Agrawal)
  - IEEE International Conference on Data Mining (ICDM), Singapore, Nov. 2018, on "Data Mining for eLearning Personalization" (with Prof. R. G. Baraniuk, Dr. C. Brinton, and E. Glassberg Sands)
  - ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Halifax, Canada, Aug. 2017, on "Advancing Education with Data" (with Prof. R. G. Baraniuk, Prof. M. Chiang, Dr. C. Brinton, Dr. S. Rao, R. Sumbaly, and J. Ngiam)
  - Neural Information Processing Systems (NIPS), Barcelona, Spain, Dec. 2016, on "Machine Learning for Education" (with Prof. R. G. Baraniuk, Prof. C. Studer, Dr. P. Grimaldi, and J. Ngiam)
  - International Conference on Machine Learning (ICML), Lille, France, July 2015, on "Machine Learning for Education" (with Prof. R. G. Baraniuk, Prof. E. Brunskill, Dr. J. Huang, Prof. M. van der Schaar, Prof. M. C. Mozer, and Prof. C. Studer)
  - Neural Information Processing Systems (NIPS), Montreal, Canada, Dec. 2014, on "Human Propelled Machine Learning" (with Prof. R. G. Baraniuk, Prof. C. Studer, and Prof. M. C. Mozer)
- Journal and conference program committee/senior program committee/reviewing:
  - Journal of Machine Learning Research (JMLR)
  - Machine Learning
  - Data Mining and Knowledge Discovery (DAMI)
  - IEEE Transactions on Signal Processing (TSP)
  - IEEE Transactions on Learning Technologies (TLT)
  - IEEE Journal of Selected Topics on Signal Processing (JSTSP)
  - Statistics and Computing
  - International Journal of Artificial Intelligence in Education (IJAIED)
  - Journal of Educational Data Mining (JEDM)

- Psychometrika
- International Conference on Educational Data Mining (EDM)
- Neural Information Processing Systems (NIPS)
- International Conference on Machine Learning (ICML)
- International Conference on Learning Representations (ICLR)
- AAAI Conference on Artificial Intelligence (AAAI)
- International Joint Conference on Artificial Intelligence (IJCAI)
- SIAM Conference on Data Mining (SDM)
- Annual Meeting of the Association of Computational Linguistics (ACL)
- Conference on Empirical Methods in Natural Language Processing (EMNLP)
- IEEE Signal Processing Letters
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
- European Conference on Signal Processing (EUSIPCO)
- Conference on Information Sciences and Systems (CISS)
- Asilomar Conference on Signals, Systems, and Computers (Asilomar)

Publications

1. Journal and conference publications

1. N. Fernandez, A. Scarlatos, S. Woodhead, and A. S. Lan, "DiVERT: Distractor Generation with Variational Errors Represented as Text for Math Multiple-choice Questions," Conference on Empirical Methods in Natural Language Processing (EMNLP), Nov. 2024

2. J. Lee, H. McNichols, and A. S. Lan, "Exploring Automated Keyword Mnemonics Generation with Large Language Models via Overgenerate-and-Rank," Conference on Empirical Methods in Natural Language Processing (EMNLP) Findings, Nov. 2024

3. N. Fernandez, A. Scarlatos, and A. S. Lan, "SyllabusQA: A Course Logistics Question Answering Dataset," Annual Meeting of the Association for Computational Linguistics (ACL), Aug. 2024

4. J. Lee, D. Smith, S. Woodhead, and A. S. Lan, "Math Multiple Choice Question Generation via Human-Large Language Model Collaboration," International Conference on Educational Data Mining (EDM), July 2024

5. H. Heickal and A. S. Lan, "Generating Feedback-Ladders for Logical Errors in Programming using Large Language Models," International Conference on Educational Data Mining (EDM), July 2024

6. N. Fernandez and A. S. Lan, "Interpreting Latent Student Knowledge Representations in Programming Assignments," International Conference on Educational Data Mining (EDM), July 2024

7. H. McNichols, S. Fancsali, S. Ritter, and A. S. Lan, "Can Large Language Models Replicate ITS Feedback on Open-Ended Math Questions?" International Conference on Educational Data Mining (EDM), July 2024

8. A. Felipe Zambrano, R. S. Baker, S. Baral, N. T. Heffernan, and A. S. Lan, "From Reaction to Anticipation: Predicting Future Affect," International Conference on Educational Data Mining (EDM), July 2024

9. A. Scarlatos, D. Smith, S. Woodhead, and A. S. Lan, "Improving the Validity of Automatically Generated Feedback via Reinforcement Learning," International Conference on Artificial Intelligence in Education (AIED), July 2024

10. W. Feng, H. McNichols, J. Lee, A. Scarlatos, D. Smith, S. Woodhead, and A. S. Lan, "Exploring Automated Distractor Generation for Math Multiple-choice Questions via Large Language Models," Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL) Findings, June 2024

11. N. Ashok Kumar and A. S. Lan, "Improving Socratic Question Generation using Data Augmentation and Preference Optimization," Workshop on Innovative Use of NLP for Building Educational Applications (BEA@NAACL), June 2024

12. A. Scarlatos, W. Feng, D. Smith, S. Woodhead, and A. S. Lan, "Improving Automated Distractor Generation for Math Multiple-choice Questions with Overgenerate-and-rank," Workshop on Innovative Use of NLP for Building Educational Applications (BEA@NAACL), June 2024

13. Y. Chu, S. Hosseinalipour, E. Tenorio, L. Castro, K. Douglas, A. S. Lan, and C. Brinton, "Multi-Layer Personalized Federated Learning for Mitigating Biases in Student Predictive Analytics," IEEE Transactions on Emerging Topics in Computing, June 2024

14. H. McNichols, W. Feng, J. Lee, A. Scarlatos, D. Smith, S. Woodhead, and A. S. Lan, "Automated Distractor and Feedback Generation for Math Multiple-choice Questions via In-context Learning," NeurIPS Workshop on Generative AI for Education, Dec. 2023

15. A. Felipe Zambrano, R. S. Baker, and A. S. Lan, "Active Learning for a Classroom Observer who Can't Time Travel," Whats next in Affect Modelling Workshop at Conference of the Association for the Advancement of Affective Computing (ACII), Sept. 2023

16. A. Scarlatos and A. S. Lan, "Tree-Based Representation and Generation of Natural and Mathematical Language," Annual Meeting of the Association for Computational Linguistics (ACL), July 2023

17. M. Zhang, Z. Wang, Y. Zhang, W. Feng, and A. S. Lan, "Interpretable Math Word Problem Solution Generation via Step-by-step Planning," Annual Meeting of the Association for Computational Linguistics (ACL), July 2023

18. N. Ashok Kumar, N. Fernandez, Z. Wang, and A. S. Lan, "Improving Reading Comprehension Question Generation with Data Augmentation and Overgenerate-and-rank," Workshop on Innovative Use of NLP for Building Educational Applications (BEA@ACL), July 2023

19. N. Ashok Kumar, W. Feng, J. Lee, H. McNichols, A. Ghosh, and A. S. Lan, "A Conceptual Model for End-to-End Causal Discovery in Knowledge Tracing," International Conference on Educational Data Mining (EDM), July 2023

20. M. Zhang, N. Heffernan, and A. S. Lan, "Modeling and Analyzing Scorer Preferences in Short-Answer Math Questions," International Conference on Educational Data Mining (EDM), July 2023

21. J. Lee and A. S. Lan, "SmartPhone: Exploring Keyword Mnemonic with Auto-generated Verbal and Visual Cues," International Conference on Artificial Intelligence in Education (AIED), July 2023

22. H. McNichols, M. Zhang, and A. S. Lan, "Algebra Error Classification with Language Models," International Conference on Artificial Intelligence in Education (AIED), July 2023

23. W. Feng, A. Ghosh, S. Sireci, and A. S. Lan, "Balancing Test Accuracy and Security in Computerized Adaptive Testing," International Conference on Artificial Intelligence in Education (AIED), July 2023

24. A. Ghosh and A. S. Lan, "DiFA: Differentiable Feature Acquisition," AAAI Conference on Artificial Intelligence (AAAI), Feb. 2023

25. N. Liu, Z. Wang, R. Baraniuk, and A. S. Lan, "Open-ended Knowledge Tracing for Computer Science Education," Conference on Empirical Methods in Natural Language Processing (EMNLP), Dec. 2022

26. Y. Chu, S. Hosseinalipour, E. Tenorio, L. Castro, K. Douglas, A. S. Lan, and C. Brinton, "Mitigating Biases in Student Performance Prediction via Attention-Based Personalized Federated Learning," ACM International Conference on Information and Knowledge Management (CIKM), Oct. 2022

27. N. Fernandez, A. Ghosh, N. Liu, Z. Wang, R. Baraniuk, and A. S. Lan, "Automated Scoring for Reading Comprehension via In-context BERT Tuning," International Conference on Artificial Intelligence in Education (AIED), July 2022

28. M. Zhang, S. Baral, N. Heffernan, and A. S. Lan, "Automatic Short Math Answer Grading via In-context Meta-learning," International Conference on Educational Data Mining (EDM), July 2022

29. A. Scarlatos, C. Brinton, and A. S. Lan, "Process-BERT: A Framework for Representation Learning on Educational Process Data," International Conference on Educational Data Mining (EDM), July 2022

30. A. Ghosh, S. Mitra, and A. S. Lan, "DiPS: Differentiable Policy for Sketching in Recommender Systems," AAAI Conference on Artificial Intelligence (AAAI), Feb. 2022

31. D. S. McNamara, T. Arner, R. Butterfuss, D. B. Mallick, A. S. Lan, R. D. Roscoe, H. L. Roediger III, and R. G. Baraniuk, "Situating AI (and Big Data) in the Learning Sciences: Moving Toward Large-Scale Learning Sciences," In Artificial Intelligence in STEM Education: The Paradigmatic Shifts in Research, Education, and Technology, CRC Press, 2022

32. Z. Wang, M. Zhang, R. G. Baraniuk, and A. S. Lan, "Scientific Formula Retrieval via Tree Embeddings," IEEE International Conference on Big Data, Dec. 2021

33. Y. Chu, E. Tenorio, L. Castro, K. Douglas, A. S. Lan, and C. Brinton, "Click-Based Student Performance Prediction: A Clustering Guided Meta-Learning Approach," IEEE International Conference on Big Data, Dec. 2021

34. Z. Wang, R. G. Baraniuk, and A. S. Lan, "Math Word Problem Generation with Mathematical Consistency and Problem Context Constraints," Conference on Empirical Methods in Natural Language Processing (EMNLP), Nov. 2021

35. G. Lan, M. Imani, Z. Liu, J. Manjarres, W. Hu, A. S. Lan, D. Smith, and M. Gorlatova, "MetaSense: Boosting RF Sensing Accuracy using Dynamic Metasurface Antenna," IEEE Internet of Things Journal, Vol. 8, Issue 18, Sep. 2021

36. A. Ghosh, and A. S. Lan, "BOBCAT: Bi-level Optimization-Based Computerized Adaptive Testing," International Joint Conference on Artificial Intelligence (IJCAI), Aug. 2021

37. M. Zhang, Z. Wang, R. G. Baraniuk, and A. S. Lan, "Math Operation Embeddings for Open-ended Solution Analysis and Feedback," International Conference on Educational Data Mining (EDM), June 2021

38. A. Ghosh, and A. S. Lan, "Contrastive Learning Improves Model Robustness Under Label Noise," Learning from Limited or Imperfect Data (L^2ID) Workshop at CVPR, June 2021

39. A. Ghosh, J. Raspat, and A. S. Lan, "Option Tracing: Beyond Correctness Analysis in Knowledge Tracing," International Conference on Artificial Intelligence in Education (AIED), June 2021

40. Z. Wang, A. S. Lan, and R. G. Baraniuk, "Mathematical Formula Representation via Tree Embeddings," 3rd Workshop on Intelligent Textbooks at AIED, June 2021

41. S. Maghsudi, A. S. Lan, J. Xu, and M. van der Schaar, "Personalized Education in the AI Era: What to Expect Next?", IEEE Signal Processing Magazine, Vol. 38, Issue 3, Apr. 2021

42. B. Zylich and A. S. Lan, "Linguistic Skill Modeling for Second Language Acquisition," International Conference on Learning Analytics and Knowledge (LAK), Apr. 2021

43. S. Karumbaiah, A. S. Lan, S. Nagpal, R. Baker, A. Botelho, and N. Heffernan, "Using Past Data to Warm Start Active Machine Learning: Does Context Matter?", International Conference on Learning Analytics and Knowledge (LAK), Apr. 2021, **(best paper nominee)**

44. A. Ghosh, and A. S. Lan, "Do We Really Need Gold Samples for Sample Weighting under Label Noise?" Winter Conference on Applications of Computer Vision (WACV), Jan. 2021

45. A. Ghosh, B. Woolf, S. Zilberstein, and A. S. Lan, "Skill-based Career Path Modeling and Recommendation," IEEE International Conference on Big Data, Dec. 2020, **(best student paper award)**

46. S. Pandey, A. S. Lan, G. Karypis, and J. Srivastava, "Learning Student Interest Trajectory for MOOC Thread Recommendation," IEEE International Conference on Data Mining Workshops (ICDMW), Nov. 2020

47. T. Yang, A. S. Lan, and K. Narasimhan, "Robust and Interpretable Grounding of Spatial References with Relation Networks," Conference on Empirical Methods in Natural Language Processing (EMNLP) Findings, Nov. 2020

48. A. Winchell, A. S. Lan, and M. C. Mozer, "Highlights as an Early Predictor of Student Comprehension and Interests," Cognitive Science, Vol. 44, Issue 11, Nov. 2020

49. Y. Zhang, H. Dai, Y. Yun, S. Liu, A. S. Lan, and X. Shang, "Meta-knowledge Dictionary Learning on 1-bit Response Data for Student Knowledge Diagnosis," Knowledge-Based Systems 205(12), Oct. 2020

50. A. Ghosh, N. Heffernan, and A. S. Lan, "Context-Aware Attentive Knowledge Tracing," ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Aug. 2020

51. S. Sonkar, A. S. Lan, A. E. Waters, P. Grimaldi, and R. G. Baraniuk, "qDKT: Question-centric Deep Knowledge Tracing," International Conference on Educational Data Mining (EDM), July 2020

52. Z. Wang, Y. Gu, A. S. Lan, and R. G. Baraniuk, "VarFA: A Variational Factor Analysis Framework For Efficient Bayesian Learning Analytics," International Conference on Educational Data Mining (EDM), July 2020

53. B. Zylich, A. Viola, B. Toggerson, L. Al-Hariri, and A. S. Lan, "Exploring Automated Question Answering Methods for Teaching Assistance," International Conference on Artificial Intelligence in Education (AIED), July 2020

54. A. S. Lan, A. Botelho, S. Karumbaiah, R. S. Baker, and N. Heffernan, "Accurate and Interpretable Sensor-free Affect Detectors via Monotonic Neural Networks," International Conference on Learning Analytics & Knowledge (LAK), Mar. 2020

55. B. Woolf, A. Ghosh, A. S. Lan, S. Zilberstein, T. Juravich, A. Cohen, and O. Geho, "AI-Enabled Training in Manufacturing Workforce Development," AAAI Spring Sympoisum on AI in Manufacturing, Mar. 2020

56. R. Ghods, A. S. Lan, T. Goldstein, and C. Studer, "MSE-Optimal Neural Network Initialization via Layer Fusion," Conference on Information Sciences and Systems (CISS), pp. 1-6, Mar. 2020

57. Z. Ren, X. Ning, A. S. Lan, and H. Rangwala, "Grade Prediction with Neural Collaborative Filtering," IEEE International Conference on Data Science and Advanced Analytics (DSAA), Oct. 2019

58. I. Manickam, A. S. Lan, G. Dasarathy, and R. G. Baraniuk, "Tracing Political Ideology on Twitter During the 2016 U.S. Presidential Election," IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM), Aug. 2019

59. Z. Wang, A. S. Lan, A. E. Waters, P. Grimaldi, and R. G. Baraniuk, "A Meta-Learning Approach to Automatic Short Answer Grading," International Conference on Educational Data Mining (EDM), pp. 667-680, July 2019

60. T. Yang, R. Baker, C. Studer, N. Heffernan, and A. S. Lan, "Active Learning for Student Affect Detection," International Conference on Educational Data Mining (EDM), pp. 208-217, July 2019

61. Z. Ren, X. Ning, A. S. Lan, and H. Rangwala, "Grade Prediction Based on Cumulative Knowledge and Co-taken Courses," International Conference on Educational Data Mining (EDM), pp. 158-167, July 2019

62. W. Tu, C. Brinton, A. S. Lan, and M. Chiang, "Adaptive Remediation with Multi-modal Content," International Conference on Human-Computer Interaction, pp. 455-468, July 2019 **(invited paper)**

63. C. Brinton, T. Yang, P. Hansen, R. Bustamante, E. Tenorio, M. Chiang, and A. S. Lan, "Joint Prediction of Response Quality and Timing in Online Discussion Forums," IEEE International Conference on Distributed Computing Systems (ICDCS), July 2019

64. P. Naghizadeh, M. Gorlatova, A. S. Lan, and M. Chiang, "Hurts to Be Too Early: Benefits and Drawbacks of Communication in Multi-Agent Learning," IEEE International Conference on Computer Communications (INFOCOM), pp. 622-630, Apr. 2019

65. T. Yang, C. Brinton, P. Mittal, M. Chiang, and A. S. Lan, "Learning Informative and Private Representations via Generative Adversarial Networks," IEEE International Conference on Big Data, pp. 1534-1543, Dec. 2018

66. C. Brinton, S. Buccapatnam, L. Zheng, D. Cao, A. S. Lan, F. Wong, S. Ha, M. Chiang, and H. V. Poor, "On the Efficiency of Online Social Learning Networks," IEEE Transactions on Networking (TON), Vol. 26, Issue 5, pp. 2076-2089, Oct. 2018

67. A. S. Lan, J. Spencer, Z. Chen, C. Brinton, and M. Chiang, "Personalized Thread Recommendation for MOOC Discussion Forums," European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), pp. 725–740, Sep. 2018

68. A. Aghazadeh, M. Golbabaee, A. S. Lan, and R. G. Baraniuk, "Insense: Incoherent Sensor Selection for Sparse Signals," Signal Processing, Vol. 150, pp. 57–65, Sep. 2018

69. A. S. Lan, M. Chiang, and C. Studer, "An Estimation and Analysis Framework for the Rasch Model," International Conference on Machine Learning (ICML), pp. 2889–2897, July 2018

70. R. Ghods, A. S. Lan, T. Goldstein, and C. Studer, "Linear Spectral Estimators and an Application to Phase Retrieval," International Conference on Machine Learning (ICML), pp. 1729–1738, July 2018

71. A. Winchell, M. C. Mozer, A. S. Lan, P. Grimaldi, and H. Pashler, "Textbook Annotations as an Early Predictor of Student Learning," International Conference on Educational Data Mining (EDM), pp. 431–437, July 2018

72. W. Chen, A. S. Lan, D. Cao, C. Brinton, and M. Chiang, "Behavioral Analysis at Scale: Learning Course Prerequisite Structures from Learner Clickstreams," International Conference on Educational Data Mining (EDM), pp. 66–75, July 2018

73. D. Cao, A. S. Lan, W. Chen, C. Brinton, and M. Chiang, "Learner Behavioral Feature Refinement and Augmentation using GANs," International Conference on Artificial Intelligence in Education (AIED), pp. 41–46, June 2018

74. Z. Wang, A. S. Lan, W. Nie, P. Grimaldi, R. Schloss, and R. G. Baraniuk, "QG-Net: A Data-Driven Question Generation Model for Educational Content," ACM Conference on Learning at Scale (L@S), pp. 1–10, June 2018

75. M. Khodak, L. Zheng, A. S. Lan, C. Joe-Wong, and M. Chiang, "Learning Cloud Dynamics to Optimize Spot Instance Bidding Strategies," IEEE International Conference on Computer Communications (INFOCOM), Apr. 2018

76. A. S. Lan, M. Chiang, and C. Studer, "Linearized Binary Regression," Conference on Information Sciences and Systems (CISS), pp. 1–6, Mar. 2018

77. R. Ghods, A. S. Lan, T. Goldstein, and C. Studer, "PhaseLin: Linear Phase Retrieval," Conference on Information Sciences and Systems (CISS), pp. 1–6, Mar. 2018

78. A. S. Lan, A. E. Waters, C. Studer, and R. G. Baraniuk, "BLAh: Boolean Logic Analysis for Graded Student Response Data," IEEE Journal of Selected Topics in Signal Processing (JSTSP), Vol. 11, Issue 5, pp. 754–764, Aug. 2017

79. A. Aghazadeh, A. S. Lan, A. Shrivastava, and R. G. Baraniuk, "RHash: Robust Hashing via ℓ_∞-norm Distortion," Proc. International Joint Conference on Artificial Intelligence (IJCAI), pp. 1386–1394, Aug. 2017

80. A. S. Lan, C. Brinton, T. Yang, and M. Chiang, "Behavior-Based Latent Variable Model for Learner Engagement," Proc. International Conference on Educational Data Mining (EDM), pp. 64–71, June 2017

81. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Data-mining Textual Responses to Uncover Misconception Patterns," Proc. International Conference on Educational Data Mining (EDM), pp. 208–213, June 2017

82. Z. Wang, A. S. Lan, P. Grimaldi, and R. G. Baraniuk, "A Latent Factor Model For Instructor Content Preference Analysis," Proc. International Conference on Educational Data Mining (EDM), pp. 290–295, June 2017

83. A. E. Waters, P. Grimaldi, A. S. Lan, and R. G. Baraniuk, "Short-Answer Responses to STEM Exercises: Measuring Response Validity and Its Impact on Learning," Proc. International Conference on Educational Data Mining (EDM), pp. 374–375, June 2017

84. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Personalized Feedback for Open-Response Mathematical Questions using Long Short-Term Memory Networks," Proc. International Conference on Educational Data Mining (EDM), pp. 350–351, June 2017

85. J. Michalenko, A. S. Lan, and R. G. Baraniuk, "Data-mining Textual Responses to Uncover Misconception Patterns," Proc. ACM Conference on Learning at Scale (L@S), pp. 245–248, Apr. 2017 (work-in-progress session)

86. I. Manickam, A. S. Lan, and R. G. Baraniuk, "Contextual Multi-armed Bandit Algorithms for Personalized Learning Action Selection," Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 6344–6348, Mar. 2017 **(invited paper)**

87. D. Vats, A. S. Lan, C. Studer, and R. G. Baraniuk, "Optimal Ranking of Test Items using the Rasch Model," Proc. Annual Allerton Conference on Communication, Control, and Computing, pp. 464–473, Sep. 2016

88. A. S. Lan and R. G. Baraniuk, "A Contextual Bandits Framework for Personalized Learning Action Selection," Proc. International Conference on Educational Data Mining (EDM), pp. 424–429, June 2016

89. A. S. Lan, T. Goldstein, R. G. Baraniuk, and C. Studer, "Dealbreaker: A Nonlinear Latent Variable Model for Educational Data," Proc. International Conference on Machine Learning (ICML), pp. 266–275, June 2016

90. A. S. Lan, C. Studer, and R. G. Baraniuk, "Self-Expressive Clustering of Binary Data via Group Sparsity," Signal Processing with Adaptive Sparse Structured Representations (SPARS), July 2015

91. A. S. Lan, D. Vats, A. E. Waters, and R. G. Baraniuk, "Mathematical Language Processing: Automatic Grading and Feedback for Open Response Mathematical Questions," Proc. ACM Conference on Learning at Scale (L@S), pp. 167–176, Mar. 2015

92. A. S. Lan, C. Studer, and R. G. Baraniuk, "Time-Varying Learning and Content Analytics via Sparse Factor Analysis," Proc. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), pp 452–461, Aug. 2014

93. A. S. Lan, C. Studer, and R. G. Baraniuk, "Quantized Matrix Completion for Personalized Learning," Proc. International Conference on Educational Data Mining (EDM), pp. 292–295, July 2014

94. A. S. Lan, A. E. Waters, C. Studer, and R. G. Baraniuk, "Sparse Factor Analysis for Learning and Content Analytics," Journal of Machine Learning Research (JMLR), Vol. 15, pp. 1959–2008, June 2014

95. A. S. Lan, C. Studer, and R. G. Baraniuk, "Matrix Recovery from Quantized and Corrupted Measurements," Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 4973–4977, May 2014

96. D. Vats, C. Studer, A. S. Lan, L. Carin, and R. G. Baraniuk, "Test-size Reduction for Concept Estimation," Proc. International Conference on Educational Data Mining (EDM), pp. 292–295, July 2013

97. A. S. Lan, C. Studer, A. E. Waters, and R. G. Baraniuk, "Joint Topic Modeling and Factor Analysis of Textual Information and Graded Response Data," Proc. International Conference on Educational Data Mining (EDM), pp. 324–325, July 2013

98. A. S. Lan, C. Studer, A. E. Waters, and R. G. Baraniuk, "Tag-Aware Ordinal Sparse Factor Analysis for Learning and Content Analytics," Proc. International Conference on Educational Data Mining (EDM), pp. 90–97, July 2013

99. A. E. Waters, A. S. Lan, and C. Studer, "Sparse Probit Factor Analysis for Learning Analytics," Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 8776–8780, July 2013 **(invited paper)**

2. Preprints

1. A. E. Waters, A. S. Lan, R. Ning, C. Studer, and R. G. Baraniuk, "SPRITE: A Data-Driven Response Model For Multiple Choice Questions," preprint, Feb. 2016

2. D. Vats, C. Studer, A. S. Lan, L. Carin, and R. G. Baraniuk, "Test-size Reduction via Sparse Factor Analysis," preprint, Apr. 2014

Patents

1. R. G. Baraniuk, A. S. Lan, C. Studer, and A. E. Waters, "Sparse Factor Analysis for Learning Analytics and Content Analytics," US Patent 9,704,102, July 2017

2. A. S. Lan, D. Vats, A. E. Waters, and R. G. Baraniuk, "Mathematical Language Processing: Automatic Grading and Feedback for Open Response Mathematical Questions," US Patent App. No. 14/967,131, June 2016