

ZACHARY A. PARDOS

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Education

2006, BS, Computer Science – Worcester Polytechnic Institute
2012, PhD, Computer Science – Worcester Polytechnic Institute
2013, Postdoc, CSAIL / RLE – Massachusetts Institute of Technology

Professional History

July 2020 - Present, Associate Professor – University of California, Berkeley
Berkeley School of Education (100%), Cognitive Science (affiliate)
July 2013 - 2019, Assistant Professor - University of California, Berkeley
Graduate School of Education (50%), School of Information (50%)
2012-2013, Postdoctoral Associate - Massachusetts Institute of Technology
Computer Science AI Lab (CSAIL), Research Lab of Electronics (RLE)

Research Interests

Adaptive Learning, Higher Education, Artificial Intelligence, Knowledge Representation, Learning Analytics, Credit Mobility, Transfer, Recommender Systems, Human-AI Collaboration, Data Science, Digital Learning Environments, Cognitive Modeling, Big Data, Knowledge Tracing, Formative Assessment, Intelligent Tutoring Systems, Psychometrics

Select Awards and Honors

2024, Tools Competition winner (Growth Award)
2023, Best Paper nominee, ACM Learning Analytics and Knowledge Conference, Arlington, TX
2022, Best Paper nominee, Artificial Intelligence in Education Conference, Durham, UK
2021, Peder Sather awards (Open Adaptive Tutoring project)
2019, Best Paper (first author), ACM Learning @ Scale Conference, Chicago, IL
2018, New and Future AI Educator, awarded @ AAAI-18 (NSF sponsored)
2014, Elected to the Executive Committee of the Artificial Intelligence in Education Society
2013, Best Student Paper (co-author), Educational Data Mining Conference, Memphis, TN
2010, Knowledge Discovery and Data Mining (KDD) Cup, Washington, D.C.
2009, Best Student Paper (first author), Educational Data Mining Conference, Córdoba, Spain
2008-2012, National Science Foundation Graduates in K-12 Education (GK-12) Fellowship
2007-2008, Department of Education Graduates in Areas of National Need (GANN) Fellowship

Select Professional Activity

2024, Joint California Summit on Generative AI, Panelist, San Francisco, CA
2024, National Association of Higher Education Systems, Panelist, Superconvening, W., D.C.
2024, Computer Supported Education Conference, Keynote, Angers, FR
2021, College Completion Network, Invited Seminar Talk, Stanford, CA
2021, AACRAO Technology Summit Keynote
2020, Co-editor of AERA Open Special Issue on Educational Data Science
2020, Co-chair of AERA Satellite Conference on Educational Data Science
2020, ACT Tech Talk, Invited Talk on Recommendation in Higher Education, Remote

2020, Brazil Economic Society Meeting, Speaker and Panelist, São Paulo, Brazil
 2020, Appointed to Advisory Board, Gooru Learning Inc., Redwood City, CA
 2019, Stanford Graduate School of Education, Colloquium Talk, Stanford, CA
 2019, IEEE Learning with MOOCs Conference, Keynote, Milwaukee, WI
 2019, Ohio State University Sesquicentennial Conference, Panelist, Columbus, OH
 2019, EdCrunch Conference, Invited Talk, Moscow, Russia
 2019, Co-Chair, Multimodal Analytics in Edu (AIMA4EDU) Workshop @ IJCAI, Macau, China
 2019, Weizmann Institute of Social Science Learning Analytics Symposium, Tel Aviv, Israel
 2019, Udemy Seminar, San Francisco, CA
 2018, Reimagine Education Conference, Keynote, San Francisco, CA
 2018, Bay Area Registrars Conference Invited Talk, San Francisco, CA
 2018, Hanyang University's Higher Education Research Institute, Keynote, Seoul, South Korea
 2018, Open edX Conference, Invited Talk, Montréal, Canada
 2018, Columbia Teacher's College EdLab Seminar, New York, NY
 2018, NVIDIA GPU Technology Conference, Speaker, Santa Clara, CA
 2018, UC Davis Institute for Social Sciences Seminar, Davis, CA
 2018, Berkeley Evaluation and Assessment Research (BEAR) Seminar, Berkeley, CA
 2018, 10th Annual California Cognitive Science Conference Keynote, Berkeley, CA
 2018, Stanford American Society for Engineering Education Colloquium, Stanford, CA
 2016, Harvard VPAL Research Group Invited Talk, Cambridge, MA
 2016, National Academy of Education: Big Data and Privacy Workshop Panelist, Washington, D.C.
 2015, Educational Testing Service (ETS) Seminar, San Francisco, CA (telecast)
 2014, University of Pittsburgh School of Information Sciences Colloquium, Pittsburgh, PA
 2015, Editorial Board, Journal of Educational Data Mining & Int. Journal of AI in Education
 2014, Intel: Adaptive Learning Summit Keynote, Santa Clara, CA
 2014, White House/OSTP: Big Data and Privacy Workshop Panelist, Berkeley, CA
 2014, Program Co-Chair, International Conference on Educational Data Mining, London, UK
 2013, Chair, Workshop on Massive Open Online Courses (moocshop) @ AIED, Memphis, TN

Reviewing

Journals

Computers and Education
 Handbook of Educational Data Mining
 Handbook of Learning Analytics
 Int. Journal of Artificial Intelligence in Education
 Journal of Educational Data Mining
 Journal of Educational Measurement
 Journal of Learning Analytics
 Journal of Learning and Instruction
 Journal of the Learning Sciences
 Nature Human Behavior
 PLOS ONE
 Proceedings of the National Academy of Sciences

The Internet and Higher Education
 Transactions on Interactive Intel. Systems
 Transactions on Learning Technologies

Conferences

ACM Learning @ Scale '14, '16-'24
 ACM Learning Analytics and Knowledge '14-'24
 ACM Recommender Systems '19-'24
 ACM SIGCHI '19, '20 (1AC)
 Artificial Intelligence in Education '13-'21
 Educational Data Mining '09-'24
 Int. Conf. of the Learning Sciences '18

Select University Service (UC Berkeley)

2024-present, Provost's Advisory Council on Artificial Intelligence (PAC-AI)
2020-present, Head Graduate Advisor, Cognitive Science
2019-2024, Executive Advisory Group on Research, Teaching & Learning
2018-2019, Faculty Task Force: Graduate Certificate in Applied Data Science
2018-2019, Faculty Task Force: Data Science Undergrad Minor Design

Sponsored Projects

2024-2026, Tools Competition, *OATutor-GenAI: Open-source adaptive tutoring driven by generative AI research*, P.I., \$250,000
2023-2027, Foundation for California Community Colleges, *Data-Driven Facilitation of Common Course Numbering*. P.I., \$615,000
2023-2024, Bill & Melinda Gates Foundation. *Student-Centered Transfer with AI-Assisted Methods for Credit Mobility*. P.I., \$279,999
2023-2025, College Futures Foundation, *Analysis of Credit Loss Reduction Potential in California Public Post-secondary Transfer*. P.I., \$350,000
2023-2025, UC Berkeley VP of Undergraduate Education, *MicroGrant: AI Tutoring Innovations for Supporting High-demand STEM Courses*. P.I., \$100,000
2022-2024, Ascendium Education Group, *Examining Faculty Decision Making in Course Equivalency and Transfer*. P.I., \$280,000
2022-2023, College Futures Foundation. *Unclaimed Transfer Credits from California Community College*. P.I., \$65,000
2021-2022, California Community Foundation. *California 100*. P.I., \$30,000.
2021-2022, Bill & Melinda Gates Foundation. *Improving SUNY Transfer Policy Through a data-driven analysis comparing equivalent rigor of 2-year and 4-year courses*. P.I. (sub), \$115,000
2020-2022, Schmidt Futures. *Data to Drive Smart Course Selection*. P.I., \$235,000.
2020-2021, Schmidt Futures. *Seeding an Undergraduate Learning Engineering Fellowship*. P.I., \$330,000.
2019-2022, California Governor's Office of Planning and Research: California Education Learning Lab. *Community Sourced, Data-Driven Improvements to Open, Adaptive Courseware*. Co-P.I., \$53,000.
2019-2020, Ithika S+R, *Improving Articulation of Credit and Transfer Student Support at CUNY*. P.I., \$35,000
2015-2019, National Science Foundation, BIGDATA: EAGER: *Deep Learning in Higher Education Big Data to Explore Latent Student Archetypes and Knowledge Profiles*. Sponsor Award ID: 1547055. P.I., \$289,888.
2015-2019, National Science Foundation, Collaborative Research: *Personalizing Recommendations in a Large-Scale Education Analytics Pipeline*. Sponsor Award ID: 1446641. P.I., \$99,999.
2015-2016, Bill & Melinda Gates Foundation / Smart Sparrow LLC, *Next Generation Courseware Challenge: Inspark Science Network for Postsecondary Success in Entry Level Science for Disadvantaged Students*. UC SPO ID: 038528-002. P.I., \$88,000.
2013-2015, Department of Education, *Design and Development of a Dynamic Learning Maps Alternative Assessment System*. UC SPO ID: 036329-002. P.I., \$119,626.
2014, Google Faculty Research Grant, *Scaling Cognitive Modeling to Massive Open Environments*. P.I., \$18,000.

Publications

Journal Articles

- Bhandari, S., Liu, Y., Kwak, Y., & Pardos, Z. A. (2024). Evaluating the Psychometric Properties of ChatGPT-generated Questions. *Computers and Education: Artificial Intelligence*, 100284.
- Li, Z., Pardos, Z. A., & Ren, C. (2024). Aligning open educational resources to new taxonomies: How AI technologies can help and in which scenarios. *Computers & Education*, 216, 105027.
- Mangal, M., & Pardos, Z. A. (2024). Implementing equitable and intersectionality-aware ML in education: A practical guide. *British Journal of Educational Technology*, 00, 1–36.
- Kwak, Y., & Pardos, Z. A. (2024). Bridging large language model disparities: Skill tagging of multilingual educational content. *British Journal of Educational Technology*, 00, 1–19.
- Pardos, Z. A., & Bhandari, S. (2024). ChatGPT-generated help produces learning gains equivalent to human tutor-authored help on mathematics skills. *PLoS ONE*, 19(5), e0304013.
- Kizilcec, R.F., Baker, R.B., Bruch, E., Cortes, K.E., Hamilton, L.T., Lang, D.N., Pardos, Z.A., Thompson, M.E., Stevens, M.L. (2023). From pipelines to pathways in the study of academic progress. *Science*, 380, 344-347.
- Pardos, Z. A., Borchers, C., & Yu, R. (2023). Credit hours is not enough: Explaining undergraduate perceptions of course workload using LMS records. *The Internet and Higher Education*, 53, 100882.
- McFarland, D. A., Khanna, S., Domingue, B. W., & Pardos, Z. A. (2021). Education Data Science: Past, Present, Future. *AERA Open*, 7.
- Pardos, Z. A., Rosenbaum, L. F., & Abrahamson, D. (2021). Characterizing learner behavior from touchscreen data. *International Journal of Child-Computer Interaction*, 100357.
- Pardos Z. A., Nam A. J. H. (2020). A university map of course knowledge. *PLoS ONE*, 15(9)
- Fischer, C., Pardos, Z. A., Baker, R. S., Williams, J. J., Smyth, P., Yu, R., Slater, S., Baker, R., Warschauer, M. (2020). Mining Big Data in Education: Affordances and Challenges. *Review of Research in Education*, 44(1), 130–160.
- Pardos, Z. A., Fan, Z., Jiang, W. (2019). Connectionist Recommendation in the Wild: On the utility and scrutability of neural networks for personalized course guidance. *User Modeling and User-Adapted Interaction*, 29(2), 487–525.
- Pardos, Z. A., Horodyskyj, L. (2019). Analysis of Student Behaviour in Habitable Worlds Using Continuous Representation Visualization. *Journal of Learning Analytics*, 6(1), 1-15.
- Pardos, Z. A., Dadu, A. (2018). dAFM: Fusing Psychometric and Connectionist Modeling for Q-matrix Refinement. *Journal of Educational Data Mining*. Vol 10(2), 1-27.
- Pardos, Z. A. (2017). Big Data in Education and the Models that Love Them. *Current Opinion*

in Behavioral Sciences. Vol 18, 107-113. **Invited article**

- Pardos, Z. A., Whyte, A., Kao, K. (2016) moocRP: Enabling Open Learning Analytics with an Open Source Platform for Data Distribution, Analysis, and Visualization. *Technology, Knowledge and Learning*, Vol 21(1), 75-98.
- Stamper, J., Pardos, Z. A. (2016) The 2010 KDD Cup Competition Dataset: Engaging the machine learning community in predictive learning analytics. *Journal of Learning Analytics*, 3(2), 312-316. **Invited dataset summary**
- Pardos, Z. A. (2015) Commentary On "Beyond Time-on-Task: The Relationship Between Spaced Study and Certification in MOOCs." *Journal of Learning Analytics*, 2(2), 70-74. **Invited article commentary**
- Koedinger, K. R., D'Mello, S., McLaughlin, E. A., Pardos, Z. A., Rosé, C. P. (2015) Data Mining and Education. *WIREs Cognitive Science*.
- Pardos, Z. A., Baker, R. S.J.d., San Pedro, M.O.C.Z., Gowda, S. M., Gowda, S. M. (2014) Affective States and State Tests: Investigating How Affect and Engagement During the School Year Predict End-of-Year Learning Outcomes. *Journal of Learning Analytics*, 1(1), 107–128.
- Rau, M.A., Alevan, V., Rummel, N., Pardos, Z. A. (2014) How Should Intelligent Tutoring Systems Sequence Multiple Graphical Representations of Fractions? A Multi-Methods Study. *International Journal of Artificial Intelligence in Education*. 24(2), 125-161.
- Pardos, Z. A., Gowda, S. M., Baker, R. S.J.D., Heffernan, N. T. (2012) The Sum is Greater Than the Parts: Ensembling Models of Student Knowledge in Educational Software. In *ACM's Knowledge Discovery and Datamining (KDD) Explorations*, 13(2).
- Pardos, Z. A., Dailey, M., Heffernan, N. T. (2011) Learning what works in ITS from non-traditional randomized controlled trial data. *International Journal of Artificial Intelligence in Education*, 21(1-2), 45-63.
- Razzaq, L., Heffernan, N. T., Feng, M., Pardos, Z. A. (2007) Developing Fine-Grained Transfer Models in the ASSISTment System. *Journal of Technology, Instruction, Cognition, and Learning*, Vol. 5(3), 289-304.

Conference Proceedings (stringently refereed)

- Zhuang, Y., Liu, Q., Zhao, G., Huang, Z., Huang, W., Pardos, Z.A., Chen, E., Wu, J., Li, X. (2023). A Bounded Ability Estimation for Computerized Adaptive Testing. In *Proceedings of the Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*. New Orleans, LA.
- Sheel, S., Anastasopoulos, I., and Pardos, Z.A. (2024). Comparing Authoring Experiences with Spreadsheet Interfaces vs GUIs. In *Proceedings of the 14th Learning Analytics and Knowledge Conference (LAK '24)*. Association for Computing Machinery, New York, NY, USA, 598–607.
- Xu, Y. and Pardos, Z.A. (2024). Extracting Course Similarity Signal using Subword Embeddings. In *Proceedings of the 14th Learning Analytics and Knowledge*

- Conference* (LAK '24). Association for Computing Machinery, New York, NY, USA, 857–863.
- Pardos, Z.A., Tang, M., Anastasopoulos, I., Sheel, S.K., and Zhang, E. (2023). OATutor: An Open-source Adaptive Tutoring System and Curated Content Library for Learning Sciences Research. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 416, 1–17.
- Xu, L, Pardos, Z.A., Pai, A. (In press) Convincing the Expert: Reducing Algorithm Aversion in Administrative Higher Education Decision-making. To appear in Proceedings of the ACM Learning at Scale Conference (L@S '23). Copenhagen, DK. ACM.
- Borchers, C., & Pardos, Z. A. (2023). Insights into undergraduate pathways using course load analytics. In *Proceedings of the 13th International Learning Analytics and Knowledge Conference* (LAK). Association for Computing Machinery, New York, NY, USA, 219–229. ***best paper nominated***
- Condor, A. & Pardos, Z.A. (2022). Representing scoring rubrics as graphs for automatic short answer grading. In *Proceedings of the 23rd International Conference on Artificial Intelligence in Education*. Durham, UK. ***best paper nominated***
- Shao, E., Guo, S., & Pardos, Z. A. (2021). Degree Planning with PLAN-BERT: Multi-Semester Recommendation Using Future Courses of Interest. In *Proceedings of the AAAI Conference on Artificial Intelligence*, 35(17), 14920-14929.
- Jiang, W., Pardos, Z.A. (2021) Towards Equity and Algorithmic Fairness in Student Grade Prediction. In B. Kuipers, S. Lazar, D. Mulligan, & M. Fourcade (Eds.) *Proceedings of the Fourth AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society* (AIES). ACM. Pages 608–617.
- Badrinath, A., Wang, F., Pardos, Z.A. (2021) pyBKT: An Accessible Python Library of Bayesian Knowledge Tracing Models. In S. Hsiao, & S. Sahebi (Eds.) *Proceedings of the 14th International Conference on Educational Data Mining* (EDM). Pages 468-474.
- Condor, A., Litster, M., Pardos, Z.A. (2021) Automatic short answer grading with SBERT on out-of-sample questions. In S. Hsiao and S. Sahebi (Eds.) *Proceedings of the 14th International Conference on Educational Data Mining* (EDM). Pages 345-352.
- Li, Z., Ren, C., Li, X., & Pardos, Z.A. (2021) Learning Skill Transfer Models Across Systems. In N. Dowell, S. Joksimovic, M. Scheffel, & G. Siemens (Eds.) *Proceedings of the 11th International Conference on Learning Analytics and Knowledge* (LAK). ACM. Pages 354-363.
- Cockkalingam, S., Yu, R., Pardos, Z.A. (2021) Which one's more work? Predicting effective credit hours between courses. In N. Dowell, S. Joksimovic, M. Scheffel, & G. Siemens (Eds.) *Proceedings of the 11th International Conference on Learning Analytics and Knowledge* (LAK). ACM. Pages 599-605.
- Chiang, H.-Y., Camacho-Collados, J., Pardos, Z.A. (2020) Understanding the Source of Semantic Regularities in Word Embeddings. In *Proceedings of the 24th Conference on Computational Natural Language Learning* (CoNLL). ACL. Pages 119-131.

- Jadhav, A., Amir, Y., Pardos, Z.A. (2020) Lexical Relation Mining in Neural Word Embeddings. In *Proceedings of the 28th International Conference on Computational Linguistics (COLING)*. ACL. Pages 1299-1311.
- Jiang, W., Pardos, Z. A. (2020) Evaluating sources of course information and models of representation on a variety of institutional prediction tasks. In A. Rafferty and J.R. Whitehill (Eds.) *Proceedings of the 13th International Conference on Educational Data Mining (EDM)*. Pages 115-125.
- Pardos, Z.A., Jiang, W. (2020) Designing for Serendipity in a University Course Recommendation System. In K. Verbert, M. Scheffel, N. Pinkwart, & V. Kovanovic (Eds.) *Proceedings of the 10th International Conference on Learning Analytics and Knowledge (LAK)*. ACM. Pages 350–359.
- Jiang, W., Pardos, Z. A. (2019) Time Slice Imputation for Personalized Goal-based Recommendation in Higher Education. In D. Tikk & P. Brusilovsky (Eds.) *Proceedings of the 13th ACM Conference on Recommender Systems*. Copenhagen, Denmark. ACM. Pages 506-510.
- Dong, M., Yu, R., Pardos, Z. A. (2019) Design and Deployment of a Better Course Search Tool: Inferring latent keywords from enrollment networks. In M. Scheffel & J. Broisin (Eds.) *Proceedings of the 14th European Conference on Technology Enhanced Learning (EC-TEL)*. Delft, Netherlands. Springer. Pages 480-494.
- Pardos, Z. A., Chau, H., Zhao, H. (2019) Data-Assistive Course-to-Course Articulation Using Machine Translation. In J. C. Mitchell & K. Porayska-Pomsta (Eds.) *Proceedings of the 6th ACM Conference on Learning @ Scale (L@S)*. Chicago, IL. ACM. ***Best paper award***
- Kolb, J., Farrar, S., Pardos, Z. A. (2019) Generalizing Expert Misconception Diagnoses Through Common Wrong Answer Embedding. In M. Desmarais, C.F. Lynch, A. Merceron, & R. Nkambou (Eds.) *Proceedings of the 12th International Conference on Educational Data Mining (EDM)*. Montreal, Canada. Pages 342-347.
- Jiang, W., Pardos, Z. A., Wei, Q. (2019) Goal-based Course Recommendation. In C. Brooks, R. Ferguson & U. Hoppe (Eds.) *Proceedings of the 9th International Conference on Learning Analytics and Knowledge (LAK)*. ACM. Tempe, Arizona. Pages 36-45.
- Le, C. V., Pardos, Z. A., Meyer, S. D., Thorp, R. (2018) Communication at Scale in a MOOC Using Predictive Engagement Analytics. In M. Mavrikis, K. Porayska-Pomsta & R. Luckin (Eds.) *Proceedings of the 19th International Conference on Artificial Intelligence in Education (AIED)*. London, UK. Pages 239-252.
- Pardos, Z. A., Farrar, S., Kolb, J., Peh, G. X., Lee, J. H. (2018) Distributed Representation of Misconceptions. In J. Kay & R. Luckin (Eds.) *Proceedings of the 13th International Conference of the Learning Sciences (ICLS)*. London, UK. Pages 1791-1798. ***Crossover track paper*** (reviewed by both AIED and ICLS program committees)
- Pardos, Z. A., Hu, C., Meng, P., Neff, M., Abrahamson, D. (2018) Classifying Learner Behavior from High Frequency Touchscreen Data Using Recurrent Neural Networks. In D. Chin & L. Chen (Eds.) *Adjunct Proceedings of the 26th Conference on User Modeling, Adaptation and Personalization (UMAP)*. Singapore. ACM. Pages 317-322.

- Luo, Y., Pardos, Z. A. (2018) Diagnosing University Student Subject Proficiency and Predicting Degree Completion in Vector Space. In E. Eaton & M. Wollowski (Eds.) *Proceedings of the 33rd Conference on Advances in Artificial Intelligence (AAAI)*. New Orleans, LA. AAAI Press. Pages 7920-7927.
- Pardos, Z. A., Dadu, A. (2017) Imputing KCs with Representations of Problem Content and Context. In F. Cena & M. Desmarais (Eds.) *Proceedings of the 25th Conference on User Modeling, Adaptation and Personalization (UMAP)*. Bratislava, Slovakia. ACM. Pages 148-155.
- Pardos, Z. A., Tang, S., Davis, D., Le. C. V. (2017) Enabling Real-Time Adaptivity in MOOCs with a Personalized Next-Step Recommendation Framework. In C. Thille & J. Reich (Eds.) *Proceedings of the 4th Conference on Learning @ Scale (L@S)*. ACM. Pages 23-32. *13% acceptance rate*
- Pardos, Z. A., & Nam, A. J. H. (2017) The School of Information and its Relationship to Computer Science at UC Berkeley. In W. Shim & C. Chen (Eds.) *iConference Proceedings*. Wuhan, China. Pages 309-316. <https://doi.org/10.9776/17030>.
- Sharma, K., Jermann, P., Dillenbourg, P., Prieto, L. P., D'Angelo, S., Gergle, D., Schneider, B., Rau, M., Pardos, Z., & Rummel, N. (2017) CSCL and Eye-Tracking: Experiences, Opportunities and Challenges. In B. K. Smith, M. Borge, E. Mercier & K. Y. Lim (Eds.) *Proceedings of the 12th International Conference on Computer Supported Collaborative Learning (CSCL)*. Philadelphia, PA. Vol 2, 727-734.
- Pardos, Z. A., Xu, Y. (2016) Improving efficacy attribution in a self-directed learning environment using prior knowledge individualization. In S. Dawson, H. Drachsler & C. Rosé (Eds.) *Proceedings of the Sixth International Conference on Learning Analytics & Knowledge (LAK)*. Edenborough, UK. ACM. Pages 435-439.
- Pardos, Z. A. & Kao, K. (2015) moocRP: An Open-source Analytics Platform. In B. Woolf, D. Russell & G. Kiczales (Eds.) *Proceedings of the 2nd International Conference on Learning @ Scale (L@S)*. Vancouver, CA. ACM. Pages 103-110.
- MacHardy, Z., Pardos, Z. A. (2015) Evaluating the Relevance of Educational Videos using BKT and Big Data. In C. Romero & M. Pechenizkiy (Eds.) *Proceedings of the 8th International Conference on Educational Data Mining (EDM)*. Madrid, Spain. Pages 424-427.
- Tang, S., Gogel, H., McBride, E., Pardos, Z. A. (2015) Desirable Difficulty and Other Predictors of Effective Item Orderings. In C. Romero & M. Pechenizkiy (Eds.) *Proceedings of the 8th International Conference on Educational Data Mining (EDM)*. Madrid, Spain. Pages 416-419.
- Corrigan, S., Barkley, T., & Pardos, Z. A. (2015) Dynamic Approaches to Modeling Student Affect and its Changing Role in Learning and Performance. In K. Bontchieva, & F. Ricci (Eds.) *Proceedings of the 23rd International Conference on User Modeling, Adaptation and Personalization (UMAP)*. Dublin, Ireland. Springer. Pages 92-103.
- Peterson, J., Pardos, Z. A., Rau, M., Swigart, A., Colin, G., McKinsey, J. (2015) Understanding Student Success in Chemistry using Gaze Tracking & Pupillometry. In C. Conati, N. Heffernan, A. Mitrovic, & M.F. Verdejo (Eds.) *Proceedings of the Artificial*

Intelligence in Education Conference (AIED). Madrid, Spain. Springer. Pages 358-366.

- Pardos, Z. A., Bergner, Y., Seaton, D., Pritchard, D.E. (2013) Adapting Bayesian Knowledge Tracing to a Massive Open Online College Course in edX. In S.K. D'Mello, R.A. Calvo, & A. Olney (Eds.) *Proceedings of the 6th International Conference on Educational Data Mining (EDM)*. Memphis, TN. Pages 137-144.
- Falakmasir, M. H., Pardos, Z. A., Gordon, G. J., Brusilovsky, P. (2013) A Spectral Learning Approach to Knowledge Tracing. In S.K. D'Mello, R.A. Calvo, & A. Olney (Eds.) *Proceedings of the 6th International Conference on Educational Data Mining (EDM)*. Memphis, TN. Pages 28-34. ***Best student paper award***
- Pardos, Z. A., Baker, R. S.J.d., San Pedro, M.O.C.Z., Gowda, S. M., Gowda, S. M. (2013) Affective states and state tests: Investigating how affect throughout the school year predicts end of year learning outcomes. In D.D. Suthers, K. Verbert, E. Duval & X. Ochoa (Eds.) *Proceedings of the 3rd International Conference on Learning Analytics and Knowledge (LAK)*. Leuven, Belgium. ACM. Pages 117-124.
- Karlovec, M., Cardova--Sanchez, M., Pardos, Z. A. (2012) Knowledge Component Suggestion for Untagged Content in an Intelligent Tutoring System. In S.A. Cerri & W.J. Clancey (Eds.) *Proceedings of the 11th International Conference on Intelligent Tutoring Systems (ITS)*. Crete, Greece. Springer. Pages 195-200.
- Pardos, Z. A., Trivedi, S., Heffernan, N. T., Sarkozy, G. (2012) Clustered Knowledge Tracing. In S.A. Cerri & W.J. Clancey (Eds.) *Proceedings of the 11th International Conference on Intelligent Tutoring Systems (ITS)*. Crete, Greece. Pages 405-410.
- Gowda, S., Pardos, Z. A., Baker, S.J.D.R. (2012) Content learning analysis using the moment-by-moment learning detector. In S.A. Cerri & W.J. Clancey (Eds.) *Proceedings of the 11th International Conference on Intelligent Tutoring Systems (ITS)*. Crete, Greece. Pages 434-443.
- Trivedi, S. Pardos, Z. A., Sarkozy, G. & Heffernan, N. T. (2012) Co-Clustering by Bipartite Spectral Graph Partitioning for Out-of-Tutor Prediction. In K. Yacef, O. Zaïane, H. Hershkovitz, M. Yudelson & J. Stamper (Eds.) *Proceedings of the 5th International Conference on Educational Data Mining (EDM)*. Crete, Greece. Pages 33-40.
- Pardos, Z. A., Wang, Q. Y., Trivedi, S. (2012) The real world significance of performance prediction. In K. Yacef, O. Zaïane, H. Hershkovitz, M. Yudelson & J. Stamper (Eds.) *Proceedings of the 5th International Conference on Educational Data Mining (EDM)*. Crete, Greece. Pages 192-195.
- Rau, M., Pardos, Z. A. (2012) Interleaved Practice with Multiple Representations: Analyses with Knowledge Tracing Based Techniques. In K. Yacef, O. Zaïane, H. Hershkovitz, M. Yudelson & J. Stamper (Eds.) *Proceedings of the 5th International Conference on Educational Data Mining (EDM)*. Crete, Greece. Pages 168-171.
- Yumeng, Q., Pardos, Z. A., Heffernan, N. T. (2012) Towards data driven user model improvement. In M.G. Youngblood & P. McCarthy (Eds.) *Proceedings of the 25th annual Florida Artificial Intelligence Research Society Conference (FLAIRS)*. Marco Island, FL. AAAI Press.

- Pardos, Z. A., Heffernan, N. T. (2012) Tutor Modeling vs. Student Modeling. In M.G. Youngblood & P. McCarthy (Eds.) *Proceedings of the 25th annual Florida Artificial Intelligence Research Society Conference*. Marco Island, FL. AAAI Press. Pages 420-425. **Invited article**
- Pardos, Z. A., Heffernan, N. T. (2011) KT-IDEM: Introducing Item Difficulty to the Knowledge Tracing Model. In Konstant et al. (Eds.) *Proceedings of the 20th International Conference on User Modeling, Adaptation and Personalization (UMAP)*. Girona, Spain. Springer. Pages 243-254.
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