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Education

- Ph.D. (Computer Science), Michigan State University, 1983.
- M.S. (Computer Science), Michigan State University, 1980.
- B.Tech. (Electrical Engineering), Indian Institute of Technology, Bombay, 1977.

Academic Experience

2017-present	Cornelius Vanderbilt Endowed Chair, Professor of Computer Science and Computer Engineering, Department of Computer Science, Vanderbilt University, Nashville, TN. Senior Research Scientist, Institute for Software Integrated Systems (ISIS)
2004-2016	Professor of Computer Science and Computer Engineering, Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, TN. Senior Research Scientist, Institute for Software Integrated Systems (ISIS)
2001-2004	Director of Graduate Studies, Computer Science, Vanderbilt University, Nashville, TN.
1998-99	Visiting Associate Professor in Computer Science, Stanford University, Stanford, CA.
1990-2004	Associate Professor of Computer Science, Computer Engineering and Management of Technology, Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, TN. Senior Research Scientist, Institute for Software Integrated Systems (ISIS) Associate Director, Center for Intelligent Systems Research Faculty Member, Learning Sciences Institute.
1996-1998	Director, Computer Engineering Program, Vanderbilt University, Nashville, TN.
1988-1990	Assistant Professor, Department of Computer Science, Vanderbilt University, Nashville, TN.

1983-1987	Assistant Professor, Department of Computer Science University of South Carolina, Columbia, S.C. Research Faculty Member, Intelligent Systems Lab, Dept. of Computer Science, USC.
1978-1982	Graduate Research Assistant in Pattern Recognition and Image Processing Lab, Computer Science Department, Michigan State University, E. Lansing.
1980-1982	Programmer in Computer Laboratory, Dept. of Audiology and Speech Sciences, Michigan State University, E. Lansing.
1977-1978	Graduate Teaching Assistant, Computer Science Dept., Univ. of Rhode Island, Kingston.

Non-Academic Experience

Summer 1990, 1991 & 1992	Consultant to Amoco Research Laboratories. Non numeric data analysis and risk analysis.
Summer 1990	Consultant To Federal Express Air Ops Division. Multi-level diagnosis systems and training systems for mechanics.
Summer 1988	Consultant at Amoco Research Laboratories. Knowledge Based systems for well log interpretation, basin characterization, estimation of production capacities, and risk analysis.
Summer 1984	Consultant to CMS-1 Systems Engg. Group, AT&T Bell Labs, Holmdel, NJ. Designed CMS-1 (Circuit Maintenance System-1), a system for administration and maintenance of trunk lines as an expert system.
Summer 1980 & Dec. 1980	Specialist at Advanced Technology Transfer, Inc., Culver City, CA. Developed fast interactive image processing system (PPP - Picture Processing Package) on the VAX-11/780 computer system.
Summer 1974	IBM Manufacturing Operations, Bombay.

Publication Statistics

- Google h-index: 58 (i10 index: 300); Total citations: 15,149. (March 2022)

Journal Publications

Published

1. G. Biswas, A.K. Jain, and R.C. Dubes, "An Evaluation of Projection Algorithms," *IEEE Trans. on Pattern Analysis and Machine Intelligence,* vol. PAMI-3, pp. 702-708, 1981.

2. G. Biswas and R.C. Dubes, "Some experiments in 2-D grammatical inference," *Pattern Recognition Letters,* vol. 2, pp. 173-177, 1984.

3. A. Sen and G. Biswas, "Decision Support Systems: An Expert Systems Approach," *Decision Support Systems: The International Journal,* vol. 1, pp. 197-204, 1985.

4. V. Subramanian, G. Biswas, and J.C. Bezdek, "Document Retrieval Using a Fuzzy Knowledge-Based System," *Journal of Optical Engineering,* vol. 25, pp. 445-455, 1986.

5. J.C. Bezdek, G. Biswas, and L. Huang, "Transitive Closure of Fuzzy Thesauri for Information Retrieval Systems," *Intl. Jour. of Man-Machine Studies,* vol. 25, pp. 343-356, 1986.

6. G. Biswas, J.C. Bezdek, M. Marques, and V. Subramanian, "Knowledge-Assisted Document Retrieval: I. The Natural Language Interface," *Journal of the American Society for Information Sciences,* vol. 38, pp. 83-96, 1987.

7. G. Biswas, J.C. Bezdek, V. Subramanian, and M. Marques, "Knowledge-Assisted Document Retrieval: II. The Retrieval Process," *Journal of the American Society for Information Sciences,* vol. 38, pp. 97-110, 1987.

8. G. Biswas, R. Abramczyk, and M. Oliff, "OASES - An Expert System for Operations Analysis: The System for Cause Analysis," *IEEE Trans. on Systems, Man and Cybernetics,* vol. 17, pp. 133-145, 1987.

9. G. Biswas and T.S. Anand, "An Expert System Shell for Mixed Initiative Reasoning," *Journal of the Indian Institute of Science,* Bangalore, India, vol. 67, pp. 465-490, 1987.

10. G. Biswas, M. Oliff, and A. Sen, "An Expert Decision Support System for Production Control," *Decision Support Systems: The International Journal,* vol. 4, pp. 235-248, 1988.

11. G. Biswas, M. Oliff, and R. Abramczyk, "OASES (Operations Analysis Expert System): An Application in Fiberglass Manufacturing," *International Journal of Expert Systems,* vol. 1, no. 3, pp. 193-216, 1988.

12. P.K. Bose, G. Biswas, and A.M. Rao Padala, "Globe-Trotter: An Intelligent Flight Itinerary Planner," *IEEE Expert,* vol. 4, no. 2, pp. 56-64, 1989.

13. D.M. Scaturo, C. Kendall, J.C. Wendte, G. Biswas, R. Cannon, and J.C. Bezdek, "Judy Creek: A Case Study for a Two Dimensional Sediment Deposition Simulation," *Controls on Carbonate Platform and Basin Development, SEPM Special Publication no. 44,* P.M. Crevello, J.L. Wilson, F.J. Sarg, and J.F. Read, eds., pp. 63-76, 1989.

14. J. Strobel, R. Cannon, C.G.St.C. Kendall, G. Biswas, and J. Bezdek, "Interactive (SEDPAK) Simulation of Clastic and Carbonate Sediments in Shelf to Basin Settings," *Computers and Geosciences,* vol. 15, pp. 1279-1290, 1989.

15. G. Biswas, X. Yu, W.J. Hagins, J. Bezdek, J. Strobel, C.G.St.C. Kendall, and R.L. Cannon, "PLAYMAKER: A Knowledge Based Approach to Characterizing Hydrocarbon Plays," *Intl. Jour. of Pattern Recognition and Artificial Intelligence,* vol. 4, pp. 315-339, 1990.

16. P.P. Shenoy and G. Biswas, "Belief Functions and Belief Maintenance in Artificial Intelligence," Guest Editors introduction, *International Journal of Approximate Reasoning,* vol. 4, nos. 5-6, pp. 319-322, 1990.

17. C. Kendall, J. Strobel, R. Cannon, and G. Biswas, "The Simulation of Sedimentary Fill of Basins," *Journal of Geophysical Research,* vol. 96, pp. 6911-6929, 1991.

18. N. Kaul, G. Biswas, and B. Bhuva, "Multi-level Qualitative Reasoning applied to CMOS digital circuits," *Intl. Journal of AI in Engineering,* vol. 7, pp. 125-137, 1992.

19. D. Cheong, J. Strobel, G. Biswas, G. Lee, C. Kendall, R. Cannon, and J. Bezdek, "PLAYMAKER: A Knowledge-Based Expert System," *Geobyte,* vol. 7, no. 6, pp. 28-41, 1992.

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21. A.M. Tharpe, G. Biswas, and J. Hall, "AUDEX: An Expert System for Pediatric Auditory Brainstem Interpretation," *Journal of the American Academy of Audiology,* vol. 4, pp. 163-171, 1993.

22. D.L. Hibler and G. Biswas, "Restriction on Qualitative Models to ensure more Specific Behavior," *Intelligent Systems Engineering,* vol. 2, pp. 133-144, 1993.

23. D. Fisher, L. Xu, J. Carnes, Y. Reich, S. Fenves, J. Chen, R. Shiavi, G. Biswas, and J. Weinberg, "Applying AI Clustering to Engineering Tasks," *IEEE Expert,* vol. 8, no. 6, pp. 51-60, December 1993.

24. N. Kaul, G. Biswas, and B. Bhuva, "An AI Approach to Multi-Level, Mixed-mode qualitative simulation of CMOS ICs," *Computers and Electrical Engineering, An International Journal,* vol. 20, pp. 369-382, 1994.

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63. S. Narasimhan and G. Biswas, "Model-based Diagnosis of Hybrid Systems," *IEEE Trans. on Systems, Man, and Cybernetics, Part A,*, vol. 37, no. 3, pp. 348–361, May 2007.

64. S.D. Pathak, D.M. Dilts, and G. Biswas, "On the Evolutionary Dynamics of Supply Network Topologies," *IEEE Transactions on Engineering Management*, vol. 54, no. 4, pp. 662-672, November 2007.

65. K. Leelawong and G. Biswas, "Designing Learning by Teaching Agents: The Betty's Brain System," *International Journal of Artificial Intelligence in Education,* vol. 18, no. 3, pp. 181–208, 2008.

66. G. Biswas and X. Koutsoukos, "Report of the Eighteenth International Workshop on Principles of Diagnosis," *Artificial Intelligence Magazine*, pp. 95-97, Spring 2008.

67. I. Roychoudhury, M. Daigle, G. Biswas, and X. Koutsoukos, "An Efficient Method for Simulating Complex Systems with Switching Behaviors Using Hybrid Bond Graphs," *Simulation News Europe*, October 2008.

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463. Vatral, C., Biswas, G., and Goldberg, B. "A theoretical framework for multimodal learner modeling and performance analysis in experiential learning environments," *Workshop on Artificial Intelligence in Support of Guided Experiential Learning*, pages 68-78, Held in conjunction with the International Conference on Artificial Intelligence in Education (AIED), Tokyo, Japan, July 7, 2023.

464. Vatral, C., Cohn, C., Davalos, E., Biswas, G., Lee, M., Levin, D., Hall, E., and Holt, J. E. "A tale of two nurses: Studying groupwork in nurse training by analyzing taskwork roles, social interactions, and self-efficacy." *In Proceedings of the 16th International Conference on Computer-Supported Collaborative Learning-CSCL 2023*, pp. 217-220. International Society of the Learning Sciences.

465. Vatral, C., Lee, M., Cohn, C., Davalos, E., Levin, D., and Biswas, G. "Prediction of students' self-confidence using multimodal features in an experiential nurse training environment," In *International Conference on Artificial Intelligence in Education*, pages 266–271. Springer Nature Switzerland Cham, 2023.

466. Zhang, Y., Quinones-Grueiro, M., Barbour, W., Zhang, Z., Scherer, J., Biswas, G., and Work, D. "Cooperative multi-agent reinforcement learning for large-scale variable speed limit control," In *2023 IEEE International Conference on Smart Computing (SMARTCOMP)*, pages 149–156. IEEE, 2023.

467. Vatral, c., Biswas, G., Mohammed, N., and Goldberg, B. ",". *Interservice/Industry Training, Simulation and Education Conference* (I/ITSEC), NSTA, Orlando, FL, 2023.

468. Coursey, A., Diaz-Gonzalez, A., Quinones-Grueiro, M., & Biswas, G. Enhancing Prognostics with Self-Supervised Imputation. International Workshop on Principles of Diagnosis, DX-2023, Santa Cruz, CA.

469. Vatral, C., Mohammed, N., Biswas, G., Roberts, N., and Goldberg, B. "A comparative analysis interface to streamline after-action review in experiential learning environments," In *Proceedings of the 11th Annual Generalized Intelligent Framework for Tutoring (GIFT) Users Symposium* (GIFTSym11), Vol. 101. US Army Combat Capabilities Development Command–Soldier Center, 2023

470. Akpanoko, C. E. and Biswas, G. "The interplay of affective states and cognitive processes in an open-ended learning environment: A case study," In *Proceedings of the 18th International Conference of the Learning Sciences*, pages 873-880. International Society of the Learning Sciences, 2024.

471. Akpanoko, C. E., Cordell, G., Biswas, G. "Investigating the relationships between students' affective states and the coherence in their activities in open-ended learning environments," In *Proceedings of the 17th International Conference on Educational Data Mining*, pages 511–517, 2024.

472. Ashwin, T. and Biswas, G. "Identifying and mitigating algorithmic bias in student emotional analysis," In *International Conference on Artificial Intelligence in Education*, pages 89–103. Springer Nature Switzerland Cham., 2024. **Nominated for Best Paper award**.

473. Ashwin, T., Snyder, C., Akpanoko, C. E., Srigowri, M., and Biswas, G. "Combining multimodal analyses of students' emotional and cognitive states to understand their learning behaviors. In *International Conference on Computers in Education* `https://doi.org/10.58459/icce.2024.4854`.

474. Basu, S., Rachmatullah, A., McElhaney, K., Alozie, N., Yang, H., Hutchins, N., Biswas, G., and Mills, K. "A comparison of computational practices and student challenges across three types of computational modeling activities integrating science and engineering," In *Proceedings of the 18th International Conference of the Learning Sciences* ICLS 2024, pp. 1778-1781, 2024. International Society of the Learning Sciences.

475. Cloude, E. B., Munshi, A., Andres, J. A., Ocumpaugh, J., Baker, R. S., and Biswas, G. "Exploring confusion and frustration as non-linear dynamical systems," In *Proceedings of the 14th Learning Analytics and Knowledge Conference*, pages 241–252, 2024.

476. Cohn, C., Hutchins, N., Le, T., and Biswas, G. "A chain-of-thought prompting approach with LLMs for evaluating students' formative assessment responses in science," In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 38, pages 23182–23190, 2024.

477. Cohn, C., Snyder, C., Montenegro, J., and Biswas, G. "Towards a human-in-the-loop LLM approach to collaborative discourse analysis," In *International Conference on Artificial Intelligence in Education*, pages 11–19. Springer Nature Switzerland Cham., 2024.

478. Coursey, A., Quinones-Grueiro, M., and Biswas, G. "An experimental framework for evaluating the safety and robustness of UAV controllers," In *AIAA AVIATION FORUM AND ASCEND 2024*, page 4548, 2024.

479. Coursey, A., Quinones-Grueiro, M., and Biswas, G. "Quantifying the sim-to-real gap in disturbance rejection," In *35th International Conference on Principles of Diagnosis and Resilient Systems* (DX 2024), pages 16:(1-18). Schloss Dagstuhl–Leibniz-Zentrum fur Informatik. 2024 https://doi.org/10.4230/OASIcs.DX.2024.16

480. Coursey, A., Ji, J., Quinones Grueiro, M., Barbour, W., Zhang, Y., Derr, T., Biswas, G., & Work, D. "FT-AED: Benchmark dataset for early freeway traffic anomalous event detection," *Advances in Neural Information Processing Systems,* 37, 15526-15549, 2024.

481. Darrah, T., Frank, J., Quinones-Grueiro, M., and Biswas, G. "An on-board off-board framework for online replanning: Applied to UAVs in urban environments," In *16th International Conference on Agents and Artificial Intelligence* (ICAART) 2024.

482. Davalos, E., Srivastava, N., Zhang, Y., Goodwin, A., and Biswas, G. "Gaze-viz: A web-based approach for visualizing learner gaze patterns in online educational environment," In *International Conference on Computers in Education* https://doi.org/10.58459/icce.2024.4974, 2024.

483. Davalos, E., Zhang, Y., S, A. T., Fonteles, J. H., Timalsina, U., and Biswas, G. "3D gaze tracking for studying collaborative interactions in mixed-reality environments," In *Proceedings of the 26th International Conference on Multimodal Interaction*, pages 175–183, 2024.

484. Diaz-Gonzalez, A., Coursey, A., Quinones-Grueiro, M., and Biswas, G. "A flexible data-driven prognostics model using system performance metrics," *IFAC-PapersOnLine*, 58(4), pages 222–227, 2024.

485. Diaz-Gonzalez, A., Coursey, A., Quinones-Grueiro, M., Kulkarni, C. S., and Biswas, G. "Data-driven RUL prediction using performance metrics" (short paper). In *35th International Conference on Principles of Diagnosis and Resilient Systems* (DX 2024), pages 21(1-15). Schloss Dagstuhl–Leibniz- Zentrum fur Informatik. https://doi.org/10.4230/OASIcs.DX.2024.21, 2024.

486. Fonteles, J., Davalos, E., Ashwin, T., Zhang, Y., Zhou, M., Ayalon, E., Lane, A., Steinberg, S., Anton, G., Danish, J., ... and Biswas, G. "A first step in using machine learning methods to enhance interaction analysis for embodied learning environments. In *International Conference on Artificial Intelligence in Education*, pages 3–16. Springer Nature Switzerland Cham. 2024.

487. Fonteles, J., Srivastava, N., Davalos, E., Ashwin, T., and Biswas, G. "Designing an AI-enhanced timeline for monitoring multimodal interactions in embodied learning environments," In *International Conference on Computers in Education,* 2024. https://doi.org/10.58459/icce.2024.4907

488. Fonteles, J. H., Akpanoko, C. E., Wisniewski, P. J., and Biswas, G. "Promoting equitable learning outcomes for underserved students in open-ended learning environments," In *Proceedings of the 23rd Annual ACM Interaction Design and Children Conference*, pages 307–321, 2024.

489. Huang, Y., Coursey, A., Quinones-Grueiro, M., and Biswas, G. "Time-series few shot anomaly detection for HVAC systems," *IFAC-Papers OnLine*, 58(4), pages 426–431, 2024.

490. McElhaney, K. W., Basu, S., Alozie, N., Hutchins, N., Rachmatullah, A., Mills, K., and Biswas, G. "Broadening participation in stem-based computational modeling by leveraging alternatives to programming," In *Proceedings of the 18th International Conference of the Learning Sciences,* ICLS 2024, pages 2325-2326, 2024. International Society of the Learning Sciences.

491. Schneider, B., Davis, R., Martinez-Maldonado, R., Biswas, G., Worsley, M., and Rummel, N. "Stepping outside the ivory tower: How can we implement multimodal learning analytics in ecological settings and turn complex temporal data sources into actionable insights"? In *Proceedings of the 17th International Conference on Computer-Supported Collaborative Learning,* CSCL 2024, pp. 323-330, 2024. International Society of the Learning Sciences.

492. Sharma, S. D., Coursey, A., Quinones-Grueiro, M., and Biswas, G. "Comparison of transfer learning techniques for building energy forecasting," *IFAC-PapersOnLine*, 58(4) pages 180–185, 2024.

493. Snyder, C., Hutchins, N. M., Cohn, C., Fonteles, J. H., and Biswas, G. "Analyzing students' collaborative problem-solving behaviors in synergistic STEM+C learning," In *Proceedings of the 14th Learning Analytics and Knowledge Conference*, pages 540–550, 2024.

494. Snyder, C., Wen, C.-T., Hutchins, N. M., Vatral, C., Liu, C.-C., and Biswas, G. "Investigating collaborative problem-solving behaviors during STEM+ C learning in groups with different prior knowledge distributions," In *Proceedings of the 17th International Conference on Computer-Supported Collaborative Learning*, CSCL 2024, pp. 107-114. 2024. International Society of the Learning Sciences. **Winner of Best Paper Award**.

495. Ashwin, T.S, and Biswas, G. "Relating students' cognitive processes and learner-centered emotions: An advanced deep learning approach," In *Proceedings of the 26th International Conference on Multimodal Interaction*, pages 575–584, 2024.

496. Vatral, C., Mohammed, N., Roberts, N., Goldberg, B., and Biswas, G. "Implementing a longitudinal performance comparison interface for improved after-action review in experiential learning," In *Proceedings of the 12th Annual Generalized Intelligent Framework for Tutoring (GIFT) Users Symposium* (GIFTSym12), pages 137-146. 2024. US Army Combat Capabilities Development Command–Soldier Center.

497. Zhou, M., Fonteles, J., Danish, J., Davalos, E., Steinberg, S., Biswas, G., and Enyedy, N. "Exploring artificial intelligence-supported interaction analysis," In *Proceedings of the 18th International Conference of the Learning Sciences*, ICLS 2024, pp. 2327-2328, 2024. International Society of the Learning Sciences.

Awards

- NASA 2011 Aeronautics Research Mission Directorate Technology and Innovation Group Award for Vehicle Level Reasoning System and Data Mining methods to improve aircraft diagnostic and prognostic systems
  Awarded to Honeywell and Vanderbilt researchers (Biswas, Koutsoukos, and Mack) for their project on VIPR: Vehicle Integrated Prognostics Reasoner.

- National Academies of Sciences, Engineering, and Medicine Aviation Safety Assurance Committee, "In-Time Aviation Safety Management: Challenges and Research for an Evolving Aviation System," January 2017 − February 28, 2018.

- IEEE Fellow, 2014; IEEE Life Fellow, 2020.

- Prognostics and Health Management (PHM) Society Fellow, 2016

- Asia Pacific Society for Computers in Education (APSCE) Fellow, 2020.

- EDM 2023 Prof. Ramkumar Educational Data Mining Test of Time Award for A contextualized, differential sequence mining method to derive students' learning behavior patterns.

Board Member and Committees (current)

- Executive Board Member, Asia Pacific Society for Computers in Education, 3-year term starting January 2010. Re-elected until December 2025.
- Expert Committee, Organization for Economic Cooperation and Development (OECD) Directorate for Education and Skills Expert Committee for Designing 2025 PISA (Program for International Student Assessment) Test for Learning in the Digital World, 2019-present.

Invited Talks

- Tutorial on "The Design, Implementation and Use of Expert Systems," *Fourth Annual Conference on Intelligent Systems and Machines,* Oakland University, MI, April 1986.
- "Artificial Intelligence in Production Planning and Control," *1987 Southeast Decision Sciences Institute Conference,* Feb. 18-20, Richmond, VA.
- Panel on "What expert systems can/can't do ?" at the First Annual Meeting of the AI Society of Mid-Atlantic States," (Jim Hendler, moderator) Blacksburg, VA, March 1987.
- "Knowledge Based Systems Research in the Computer Science Department at the University of South Carolina," *1987 Meeting of the South Carolina Academy of Sciences,* April 1987.
- "XX (eXpert eXplorer): An Analogical Reasoning System for Hydrocarbon Play Analysis," *Mobil Research Labs., Dallas, Exxon Research, Houston, Shell Research, Houston, Standard Oil Company, Austin, Tenneco, Houston, Sun Oil Company, Dallas, Philips Oil, Bartlesville, OK, Boeing High Tech Research Center, Seattle.,* August-September 1987.
  Arco Research Labs, Mobil Research Labs, Dallas, TX, November 1987.
- "Reasoning with Uncertainty in Knowledge Based Systems," *Advanced Computational Methods Center,* University of Georgia, Athens, May 1987.
- "Reasoning with Uncertainty in Knowledge Based Systems," *Center for Machine Intelligence, College of Engineering, USC, November* 1987.
- "XX (eXpert eXplorer): A Workstation Toolbox for the Explorationist," *Amoco Exploration, Houston, TX, Conoco Research, Houston, TX,* February 1988.
- "An Intelligent Interface to a Facies Log Analysis System," *Amoco Research Laboratories,* Tulsa, OK, August 1988.
- "Belief Functions and the Dempster-Shafer Theory: Applications to AI Reasoning," *Departments of Computer Science and Statistics Seminar Series,* Univ. of South Carolina, Columbia, S.C., April 1989.
- "Classification using Non Numeric Data in the Basin Catalog," *Amoco Exploration, Houston, TX,* May 1989.
- "Thoughts Experiments and Qualitative Reasoning," *Department of Computer Science, Michigan State University,* E. Lansing, MI, August 17, 1989.

- "Artificial Intelligence: Second Generation Business Applications," *Seminar at the IT Forum*, London, England, sponsored by BEALL Ltd., Nov. 3, 1989.
- "Thoughts Experiments and Qualitative Reasoning," *IBM Thomas J. Watson Research Center,* Yorktown Heights, NY, November 13, 1989.
- "Thoughts Experiments and Qualitative Reasoning," *Phillips Laboratories,* Briarcliff Manor, NY, November 15, 1989.
- "Thoughts Experiments and Qualitative Reasoning," *Computer Science and Engineering Seminar, Univ. of Louisville,* Louisville, KY, Dec. 1, 1989.
- "Applying Non Numeric Data to Classification and Risk Analysis," *Amoco Research Center, Tulsa, OK,* June 1990.
- "Second Generation Expert Systems: Model-Based Reasoning and its Applications," *Silver Jubilee Session of the Computer Society of India, Calcutta, India,* Nov. 2, 1990.
- "Knowledge-Based Systems: Second Generation Business Applications," *Two-day intensive course, IBC Technical Services,* Nov. 21-22, 1990, London, UK.
- "Applying Non Numeric Data to Classification and Risk Analysis," *Amoco Research Labs,* Tulsa, OK, May 1991.
- "Knowledge-Based Systems: Second Generation Business Applications," *Invited Speaker, Data Processing Managers Association,* Nashville, TN, December 1991.
- "Modeling for Diagnosis of Complex Continuous-valued Systems," Stanford University, Stanford, CA, March 1992.
- "PLAYMAKER: A Knowledge-based Approach to Characterizing Hydrocarbon Plays," Institute for Petroleum in Colombia (ICP), Bucaramanga, Colombia, June 1992.
- "Model-based Reasoning and its Applications," University of Los Andes, Bogota, Colombia, June 1992.
- Panel on "Role of Uncertainty in Expert Systems for Exploration Activities," Conference on Artificial Intelligence in Petroleum Exploration and Production, Houston, TX, July 1992.
- "Database Mining," *Conference on AI in Petroleum Exploration and Production (CAIPEP-93),* Dallas, TX, May 1993.
- "An Efficient Scheme for Diagnosis of Complex, Continuous Systems," *(i) The University of Tokyo, Tokyo, Japan to a consortium of Japanese industry, June 1993, (ii) Hitachi Advanced Research Labs,* Tokyo, Japan, June 1993, *(iii) Toshiba SSEL,* Kawasaki City, Japan, June 1993, *(iv) Mitsubishi Research Institute,* Tokyo, Japan, June 1993.
- "Conceptual Clustering and Knowledge Discovery in Databases," *(i) Teijin Labs,* Kawasaki City, Japan, June 1993, *(ii) Fujitsu Research Labs,* Japan, June 1993.
- "Second Generation Expert Systems," *Teijin Labs,* Kawasaki City, Japan, June 1993.
- "Intelligent Manufacturing Systems: State of the Art in U.S. and Japan," *U.S.-Japan Program, Vanderbilt University of Public Policy Studies,* Nashville, TN, November 1993.

- "Applications of AI to the Oil Industry," *National Center for Software Technology,* Bombay, India, December 1993.
- "Intelligent Manufacturing Systems: State of the Art," *National Center for Software Technology,* Bombay, India, December 1993.
- "Intelligent Manufacturing and Environmentally Conscious Manufacturing," *CAD Center, Indian Institute of Technology,* Bombay, December 1993.
- "Scientific Discovery in Geological Databases," *Arco Research Labs,* Plano, TX, May 1994.
- "Intelligent and Environmentally Conscious Manufacturing," *School of Engineering, Tennessee State Univ.*, February 1995.
- "Intelligent Scheduling and Planning for Holonic Systems," *Toshiba Corp.*, Kawasaki City, Japan, May 1995.
- "Modeling Hybrid Systems for Diagnosis," *Mitsubishi Research Inst.*, Tokyo, Japan, May 1995.
- "Workshop on LCA Methodology and ECMM Analysis," *Intl. Conf. on Industrial Waste Minimization*, Taipei, Taiwan, Nov. 1995.
- "Intelligent Learning Environments: The Next Generation," *National Central University*, Taiwan, Nov. 1995.
- "Planning under Uncertainty by Spreading Activation Through an Adaptive Planning Network," *Tokyo-Denki Univ.,* Saitama, Dec. 1996.
- "Monitoring, Prediction and Fault Isolation in Dynamic Physical Systems, *PNC*, Mito, Japan, Dec. 1996.
- "Macrocontexts plus Microworlds: The Jasper Project and AdventurePlayer," *Univ. of Electro-Communications*, Chofu, Tokyo, Japan, Dec. 1996.
- "Planning and Distributed Scheduling for Intelligent Manufacturing," *Toshiba Manufacturing Engineering Research Center,*, Yokohama, Japan, Dec. 1996.
- "Assessment of Domain Learnability (ADL) in the Context of AC and DC Circuit Problem Solving," *NPRDC*, San Diego, CA, July 1997.
- "IMA and Spreading Activation for Flexible Robotics Systems," *Tokyo-Denki Univ.,* Saitama, Aug. 1997.
- "Fault Isolation from Transients in Dynamic Physical Systems," *Univ. of Osaka ISIR*, Osaka, Japan, Aug. 1997.
- "Formal Specifications of Hybrid Dynamic System Models," *Univ. of Osaka ISIR*, Osaka, Japan, Aug. 1997.
- "Distributed Scheduling for Holonic Manufacturing Systems," *Toshiba Corp., SSEL Division,* Kawasaki City, Japan, Aug. 1997.
- "EcoDS: A Decision Support System for Streamlined LCA," *Japan LCA Forum,* Tokyo, Japan, Aug. 1997.

- "What every DXer should know about Systems Theory," *Eighth Intl. Workshop on Principles of Diagnosis (DX-97)*, with M.J. Chantler, Mont. St. Michel, France, Sept. 1997.
- "Monitoring, Prediction, and Fault Isolation in Complex Physical Systems," *Univ. of Paris-Nord (XIII),* Villetaneuse, France, Sept. 1997.
- "Formal Specifications of Hybrid Dynamic System Models," *Knowledge Systems Laboratory, Dept. of Computer Science, Stanford Univ.,* Palo Alto, CA, Dec. 1997.
- "Formal Specifications of Hybrid Dynamic System Models," *Xerox PARC,* Palo Alto, CA, Dec. 1997.
- "Fault Isolation from Transients in Dynamic Physical Systems," *HP Labs,* Palo Alto, CA, Dec. 1997.
- "A Comprehensive Framework for Model-based Monitoring and Diagnosis," *NASA Ames Research Center,* Mountain View, CA, Sept. 1998.
- "Modeling and Analysis of Hybrid Dynamic System ," *KSL Seminar Series,* Stanford University, CA, Oct. 1998.
- "A Comprehensive Framework for Model-based Monitoring and Diagnosis," *Nobots Seminar Series,* Stanford University, CA, Oct. 1998.
- "A Comprehensive Framework for Model-based Monitoring and Diagnosis," *AI Seminar Series,* SRI International, Menlo Park, CA, Nov. 1998.
- "Knowledge Representation and Reasoning for Multidisciplinary Design," *DARPA RaDeo Meeting,* Seattle, WA, February 1999.
- "A Model-based approach to Fault Detection and Isolation for Complex Physical Systems," *IRISA*, Rennes, France, March 2000.
- "Applying the Hidden Markov Methodology to Unsupervised Learning of Temporal Data," Keynote Lecture, *CIMA 2001: Computational Intelligence: Methods and Applications,* Bangor, Wales, UK, June 19-22, 2001.
- "An Integrated Approach to Fault Detection and Isolation in Complex Hybrid Systems," *NASA Ames Research Center,* Mountain View, CA, July 2002.
- " Fault Diagnosis and Fault-Adaptive Control in Embedded Systems," *NASA Johnson Space Center,* Houston, TX, October 2002.
- "Teachable Agents and Student Learning," *Learning Federation Workshop on Gaming and Simulation,* Orlando, FL, December 2002.
- "Learning by Teaching: A New Agent Paradigm for Educational Software,", *Workshop on Educational Agents: More than virtual tutors,* Vienna, Austria, June 2002.
- "Towards Long-term Autonomy in Embedded Systems: Hybrid Modeling, FDI, Fault-Adaptive Control, and IVHM," *NASA Ames Research Center,* Mountain View, CA, July 2003.
- "Evaluating Teachable Agents: Educational Software that implements the Learning by Teaching Paradigm," *Dagsthul Seminar on Embodied Conversational Agents,* Dagsthul, Germany, March 2004.

- "Qualitative Modeling and Cognitive Science," *Symposium Presentation at the 26th Annual Cognitive Science Conference,* Chicago, IL, August 2004.
- Three lectures: (i) "Model-based Diagnosis of Continuous Systems," (ii) "Model-based Diagnosis of Hybrid Systems," and (iii) "Hierarchical, Limited Look Ahead Control," *Spanish Summer School on Fault Detection and Diagnosis of Complex Systems,* Penaranda de Duero, Burgos, Spain, June 2006.
- "A New Approach to Designing Intelligent Learning Environments Exploring the value of Learning by Teaching," *University of Arkansas at Little Rock,* October 13, 2006.
- "Teachable Agents and the Role of Metacognitive Support in Learning by Teaching Environments," University of Memphis Cognitive Science Seminar Series, March 2007.
- "Issues in Efficient Simulation of Component-Oriented Hybrid System Models," *2007 Summer Simulation Conference; Special Track on Computational Modeling and Simulation of Embedded Systems,* San Diego, CA, July 2007.
- "Building Students' Metacognitive Skills through Interactions with Computer-based Teachable Agents," *2008 IES Research Conference,* Washington, D.C., June 11, 2008.
- "A Learning by Teaching Approach to Help Students Develop Self-Regulatory Learning Skills in Middle School Science Classrooms," *Enhancing Learning Using Adaptive Computerized Tutoring in K-12 Settings symposium*, 30th Annual Meeting of the Cognitive Science Society, Washington, D.C., July 2008.
- "Model-based Diagnosis of Hybrid Systems," *Tutorial Presented at International Conference on Prognostics and Health Management*, Denver, Colorado, October 2008.
- "Towards Intelligent Embedded Systems: Hybrid Modeling, Diagnosis, and Fault-Adaptive Control," *Ecole Polytechnic,* Lille, France, June 18, 2009.
- "Robust Distributed Diagnosis of Complex Systems using Dynamic Bayes Nets," *University of Valladolid,* Spain, June 28 2009.
- "Self-Cognitive Capability for Anomaly Detection, Fault Analysis, and Prognosis," *Center for Advanced Life Cycle Engineering, University of Maryland,* College Park, MD , November 5, 2009.
- "Promoting Self-Regulated Learning Skills through Social Interactions in Agent-Based Environments,â? *Theme-Based Invited Talk (DIGITEL) at 17th Intl. Conf. on Computers in Education,* Hong Kong, China, Nov. 30-Dec. 4, 2009.
- "Choice-Adaptive Intelligent Learning Environments (CAILE),â? *Renowned Researcher Talk at Interactive Event: Applications of Virtual Agents, Student Modeling, and Knowledge Engineering in Education,* 17th Intl. Conf. on Computers in Education, Hong Kong, China, Nov. 30-Dec. 4, 2009.
- "Robust Distributed Diagnosis of Complex Systems using Dynamic Bayes Nets," *Linkoping University,* Linkoping, Sweden, December 16, 2009.
- "Robust and Efficient Model-based Methods for FDI in Physical Systems, *Scania Research Labs,* Stockholm, Sweden, December 20, 2009.

- "Cross-Exchanges between Mobile and Game-Based Learning," *Third International Conference on Digital Games and Toy-Enhanced Learning,* Kaohsiung, Taiwan, April 2010.
- "Modeling and Measuring Self-Regulated Learning Skills in Teachable Agent Environments," *AAAI Fall Symposium FS-02 on Cognitive and Metacognitive Educational Systems (MCES)*, Arlington, VA, Nov. 2010.
- "Robust Model-based Diagnosis of Dynamic Systems," *23rd Australasian Joint Conference on Artificial Intelligence*, Adelaide, Australia , December 2010.
- "Research Panel on Height of Graduate Students," *18th Intl. Conf. on Computers in Education*, Putrajaya, Malaysia, November 2010.
- "Robust, Distributed Diagnosis of Complex Systems using Dynamic Bayes Nets," *Honeywell Technical Center,* Minneapolis, MN, February 11, 2010.
- "Self-Cognitive Capability for Anomaly Detection, Fault Analysis, and Prognosis," Center for Advanced Life Cycle Engineering, University of Maryland, College Park, MD, November 5, 2010.
- "Advances in PHM, Anomaly Detection, Fault Analysis and Prognosis," *IEEE Prognostics and Health Management Conference,* Shenzhen, China, May 2011.
- "Data Mining for Diagnosis," *Annual Conference of the Prognostics and Health Management Society - PHM 2011*, Montreal, Canada, September 2011. Invited Tutorial.
- "Educational Data Mining," *Institute of Education Sciences (IES) Technical Working Group Meeting on Educational Data Mining*, SRI International, September 2011.
- "Data Mining for Anomaly Detection and Diagnosis: A Case Study," *22nd Intl. Workshop on Principles of Diagnosis (DX-2011),* Murnau, Germany, October 2011.
- "Game-Based and Toy-Enhanced Learning: Research Challenges," *Height of Graduate Students Mini-symposium, 19th International Conference on Computers in Education,* Chiang Mai, Thailand, December 2011.
- "Using Conversational Agents in Learning by Teaching Environments to Promote Metacognition in Middle School Science Classrooms," *National Tainan University, Tainan, Taiwan, National Central University, Jhongli, Taiwan*, May 2012.
- "Data Mining Methods to Support Real World Diagnostics and Prognostics," *2012 Prognostics and System Health Management Conference (PHM 2012),* Beijing, China, May 2012.
- "A Model-Based Approach to Prognostics of Electronic Capacitors: Accelerated Experiments for Electrical and Thermal Overstress Conditions," *GE Tech Center,* Bangalore, India, July 17, 2012.
- "Educating Our Students through Games," *CGAMES Conference,* Louisville, KY, August-Sept. 2012.
- "Open-ended Environments That Help Middle School Students Develop Metacognitive Strategies for Learning Science," *University of Pittsburgh Learning Research and Development Center (LRDC) 50th Anniversary Distinguished Speaker Series*, Pittsburgh, PA, April 4, 2013.

- "Metacognition and Self-Regulation," *ARL GIFT User Meeting,* Memphis, TN, July 13, 2013.
- "Betty's Brain: Helping Middle School Students Develop Metacognitive Strategies for Learning Science," *American Psychological Association, Division 3 (Experimental Psychology) Symposium on Technological Innovations in Education,* Honolulu, Hawaii, August 2013.
- "Case Studies in Qualitative Modeling and Reasoning," *QR 2013 - 27th Qualitative Reasoning Workshop,* Schloss Etelsen, Bremen, Germany, Aug. 27-30, 2013.
- "Model-based Diagnosis - Where Are We? And Where Do We Go from Here?" Panel Discussion at *International Workshop on Principles of Diagnosis,* Graz, Austria, September 2015.
- "Analyzing Students' Learning Behaviors in Open Ended Learning Environments (OELEs)," Cognitive Science Invited Speaker Series, Department of Philosophy, The Faculties of Humanities and Theology, Lund University, Sweden. October 21, 2015.
- "CTSiM: A Computational Thinking Environment for Learning Science using Simulation and Modeling," Sixth International Conference to review research on Science, Technology and Math Education (epiSTEME 6), Mumbai, India, December 15-18, 2015.
- "AI in Open-Ended Learning Environments: Betty's Brain," Workshop on Open Ideas at Pearson: Sharing Independent insights on the big, unanswered questions in education, UCL Knowledge Lab, London UK, March 2016.
- "Using Analytics and Mining to Analyze and Support Students in Open Ended Learning Environments," Virginia Tech Graduate Seminar in Engineering Education, November 18, 2016.
- "Building Adaptive Scaffolding in CTSiM: A computational Thinking Environment for Learning Science using Simulation and Modeling," Keynote Talk, Fifth International Conference on Educational Innovation through Technology. (EITT 2016). Tainan, Taiwan, September 22-24, 2016.
- "Using Analytics and Mining to Analyze and Support Students in Open Ended Learning Environments," SRI International, Menlo Park, CA, Sept 14, 2017.
- "Diagnosis-Driven Prognosis for Decision Making," NASA Ames Research Center, Moffett Field, CA, Sept 15, 2017.
- "CTSiM: A Computational Thinking Environment for Learning Science using Simulation and Modeling," Carnegie Mellon University, PIER: PIER: Program in Interdisciplinary Education Research, Pittsburgh, PA, Nov 27, 2017.
- "Using Analytics and Mining to Analyze and Support Students in Open Ended Learning Environments," Carnegie Mellon University, Department Colloquium, Pittsburgh, PA, Nov 28, 2017.
- "CTSiM: A Computational Thinking Environment for Learning Science using Simulation and Modeling," International Conference on Computational Thinking in Education, Hong Kong, July 13-15, 2017.
- "How Artificial Intelligence and Machine Learning can improve Educational Excellence," Damanhour University, Damanhour, Egypt, August 11, 2018.

- "C2STEM: Collaborative, Computational STEM Learning Environment," IIT Bombay Diamond Jubilee Celebrations, Mumbai, India, November 19, 2018.
- "Using Analytics and Mining to Analyze and Support Students in Open-Ended Learning Environments," Interdisciplinary Program in Educational Technology, IIT Bombay, Mumbai, India, November 20, 2018.
- "Combining Data-Driven and Model-Based Methods to Improve Diagnosis of Complex Systems," ETH Zurich, Switzerland. February 4, 2019.
- "Betty's Brain: An Open-Ended Learning Environment for Learning Middle School Science," ANIMATAS EPFL Winter School. Lausanne, Switzerland. February 6, 2019.
- "Data-Driven Methods to Improve Diagnosis of Complex Systems. Polytech Nancy," University of Lorraine, France. March 6, 2019.
- "Combining Data-Driven and Model-Based Methods to Improve Diagnosis and Control of Complex Systems," CID CRAN Labs, Nancy, France. March 7, 2019.
- "Using Analytics and Mining to Analyze and Support Students in Open Ended Learning Environments," Third Global Summit of AI and Big Data in Education. Collaborative Innovation Center of Assessment for Education. Beijing Normal University, August 1, 2019.
- "Improved Learner Modeling in support of Self-Improving Tutoring System," 7th Cyber Psychology and Behavioral Seminar. Central China Normal University, Wuhan. October 10, 2019.
- "Betty's Brain: An Open-Ended Learning Environment for Learning Middle School Science," Harvard University Graduate School of Education. March 3, 2021.
- "Learner Modeling in support of Self-Improving Tutoring Systems," ARL Workshop on SWOT Analysis of Intelligent Tutoring Systems. Memphis, TN, Sept 23, 2021.
- "Individual and Team Training in Battle Drill Operations," University of Central Florida, Learning Sciences Cluster, October 14, 2021.
- "AI-Empowered Open-Ended Learning Environments in STEM Domains," University of Rochester, Dept. of Computer Science, November 12, 2021.
- "Betty's Brain: An Open-Ended Learning Environment for Learning Middle School Science," Digital Promise, February 1, 2022.
- "Open Ended Learning Environments (OELEs) to Support Learning and Training," Augmented Intelligence Workshop, August 25, 2022.
- "Multimodal Learning Analytics for Open-Ended Learning Environments (MMLA)," Expert Talk. Center for Integrative Research in Computing and Learning: Shaping AI and Emerging Technologies to Empower Learning Communities. Arlington, VA, Nov. 2, 2023.
- "Artificial companions of 2040: Imagination and conjectures triggered by the current ChatGPT and their roles in the Seamless AI World." MetaAces, Metaverse and Artificial Companions in Education and Society, Taipei, Taiwan, 2023.

- "Assessing Student Learning in Open Ended Learning Environments from Sequential to Multimodal Data Analysis," International Conference on Educational Data Mining, Invited Talk for Test of Time Award, 2023; July 14-17, 2024, Atlanta, GA.
- "Instructional Design to Support Open-Ended Learning: The SPICE Curriculum," International Symposium "Integration of Discovery and Instruction, July 2-3, 2024, Freiburg, Germany.
- "Harnessing Multimodal Analytics in the Classroom to Understand Students' Collaborative Learning Behaviors," Keynote 15th International Learning Analytics and Knowledge Conference (LAK 2025), Dublin, Ireland, March 2025.

Research Proposals

Funded Research

List of Funded Proposals

Currently funded proposals

1. **": Implementing Betty's Brain in the PILA Environment - Phase 5,"** OECD PILA, $55,000, PI, October 2021 to January 2025.
2. **Learning Engineering Virtual Institute (LEVI): ALTER-Math: AI-augmented Learning-by-Teaching to Enhance and Renovate Math Learning,** Schmidt Futures, $1,498,920, October 2023 to January 2027.
3. **NSF AI Institute: The Institute for an AI-Engaged Future of Learning (ENGAGE AI),** NSF, $4,149,999, October 2021 to September 2026.
4. **Collaborative Research: An Interdisciplinary Approach to Prepare Undergraduates for Data Science Using Real-World High Frequency Data,** NSF, $631,435, October 2019 to September 2025.
5. **Multimodal Analytics for Learner Modeling and After-Action Review in Synthetic Training Environments,** U.S. Army Simulation and Training Center, $1,261,988, June 2025 to May 2028.
6. **Collaborative Research: Supporting Teacher Customizations of an Integrated Science, Engineering, and Computational Thinking Curriculum Unit,**, NSF, $674,999, August 2024 to July 2028.
7. **GENAI Empowered National Initaitive for Uplifting STEM Education,** IES, $ 2,784,305, September 2024 to August 2029.
8. **Planning Grant: Towards Responsible Design, Development, and Deployment of a GenAI-enabled System for Dispatcher Training in Emergency Response,** NSF, $284,305, September 2024 to August 2026.
9. **Securing High-Density Urban Airspaces,** NASA ULI, $1,650,000, September 2024 to August 2027.
10. **MOMENTS: An event-based system to support self-regulation during mixed reality simulation learning,** NSF, $899,421, August 2024 to July 2027.

Research Supervision

Ph.D. Theses

1. David Hibler, "The Thought Experiment Method: A New Approach to Qualitative Reasoning," January 1992.

2. Xudong Yu, "Multi-level Reasoning applied to Diagnosis of Complex Continuous-valued Systems," December 1992.

3. Gyesung Lee, "Increasing Reliability and Efficiency for Knowledge-Based Systems," May 1994.

4. Anne-Marie Tharpe, "A Problem-Based Curriculum in a Computerized Learning Environment for Training in the Field of Audiology," (Audiology and Speech Sciences), May 1994.

5. Margaret Curtin, "A Decision-making Framework for Environmentally Conscious Manufacturing," (Management of Technology, joint supervision with K. Kawamura), June 1995.

6. Thaddeus Crews, "AdventurePlayer: Macrocontexts plus Microworlds," July 1995.

7. Jerry Weinberg, "Syndromic Abstraction: A Method of Exploiting Domain Structure to Focus Abductive Reasoning in Association Based Representations," August 1996.

8. Pieter Mosterman, "Hybrid Dynamic Systems: A hybrid Bond Graph Modeling Paradigm and its Application in Diagnosis," May 1997.

9. Ravi Kapadia, Model-based Support for Parametric System-Level Design Optimization," Nov. 1999.

10. Cen Li, "A Bayesian Approach to Temporal Data Clustering using the Hidden Markov Model Methodology," August 2000.

11. Sriram Narasimhan, "Model Based Diagnosis of Hybrid Systems," July 2002.

12. Eric Manders, "A combined statistical detection and qualitative fault isolation scheme for abrupt faults in dynamic systems," June 2003.

13. Rajive Dhingra, "A Streamlined LCA Approach for Conducting a Cost and Residual Risk Based Evaluation of Automobile Recycling Alternatives in the U.S., Japan, and Europe," May 2004.

14. Thomas Katzlberger, "Learning by Teaching Agents," December 2004.

15. Krittaya Leelawong, "Using the Learning-by-Teaching Paradigm to Design Intelligent Learning Environments," August 2005.

16. Indranil Roychoudhury, "Distributed Diagnosis of Continuous Systems: Global Diagnosis through Local Analysis," August 2009.

17. John Kinnebrew, "Global Sensor Web Coordination and Control Using Multi-Agent systems," August 2010.

18. Chetan Kulkarni, "A Physics-Based Degradation Modeling Framework for Diagnostic and Prognostic Studies in Electrolytic Capacitors," December 2012.

19. Daniel Mack, "Anomaly Detection from Complex Temporal Sequences in Large Data," May 2013.

20. James Segedy, "Adaptive Scaffolds in Open-Ended Computer-Based Learning Environments," June 2014.

21. Joshua Carl, "High Performance Numerical Simulations to Support System Level Design," December 2015.

22. Satabdi Basu, "Fostering Synergistic Learning of Computational Thinking and Middle School Science in Computer-based Intelligent Learning Environments," April 2016.

23. Hamed Khorasgani, "Model- and Data-Driven approaches to Fault Detection and Isolation in Complex Systems," December 2017.

24. Yi Dong, "Modeling Students' Learning Behaviors in Open-Ended Learning Environments," August 2018.

25. Mona Emara, "Measuring and Supporting Self-Regulated Learning in problem solving with an Intelligent Multi-agent Learning Environment," August 2018.

26. Ningyu Zhang, "Supporting the Integrated Learning of Science, Engineering, and Computational Thinking in an Open-ended Learning Environment," August 2020.

27. Avisek Naug, "Deep Learning Methods Applied to Modeling and Policy Optimization in Large Buildings," June 2022.

28. Nicole Hutchins, "Co-Designing Teaching Augmentation Tools to Support the Integration of Problem-Based Learning in K-12 Science," August 2022.

29. Anabil Munshi, "An Adaptive Scaffolding Framework for Self-Regulated Learning in an Open-Ended Learning Environment," August 2022.

30. Bernard Yett, "Combining Block-Based Programming with Robotics Kits to support a Middle School Computing Curriculum," May 2023.

31. Ibrahim Ahmed, "Adaptive Fault-Tolerant Control Using Reinforcement Learning," July 2023.

32. Timothy Darrah, "A Health-Aware Replanning Framework for Unmanned Aerial Vehicles in Stochastic Environments," September 2023.

33. Caitlin Snyder, "Understanding Students' Collaborative Problem-Solving during STEM+C Learning Using Multimodal Analysis," July 2024.

34. Caleb Vatral, "Design and Development of Educational Technology to Support Collaborative Debriefing for Nurse Training," August 2024.

Current Ph.D. Candidates

Eduardo Davlos (RA)
Austin Coursey (NSF Fellowship)
Joyce Fonteles (RA)
Surya Rayala (RA)
Jasmine Guo (RA)
Clayton Cohn (RA)
Abel Diaz Gonzalwz (RA)
Shruti Jain (RA)
Divya Mereddy (TA)
Lucia Fang (RA)

Professional Societies

Association for Advancement of Artificial Intelligence
Sigma Xi Research Society
Artificial Intelligence in Education (AI-ED)
American Association for Advancement of Science
Asia Pacific Society for Computers in Education
IEEE Computer Society
Association for Computing Machinery
International Society for the Learning Sciences
American Society for Engineering Education

Professional Activities (External)

- **Editorships:**
  - Guest Editor, Special Issue of the International Journal of Approximate Reasoning on *Belief Revision and Belief Maintenance*, 1992.
  - Guest Editor, Special Issue on *Learning Systems for Science and Technology Education,* B. Bredeweg and B. McLaren, IEEE Transactions on Learning Technologies, 2013.
  - Guest Editor, Special Issue on *Model-based Diagnosis: Facing Challenges in Real-world Applications,* P. Struss, G. Provan, J. de Kleer, co-editors, IEEE Transactions on Systems, Man, and Cybernetics, Part A, June 2010.
  - Guest Editor, Special Issue on *Diagnosis of Complex Systems: Bridging the Gap between the FDI and DX communities,* M.O. Cordier, J. Lunze, L. Trave-Massuyes, and M. Staroswiecki, co-editors, IEEE Transactions on Systems, Man, and Cybernetics, Part B, Oct. 2005.
  - Associate Editor, IEEE Transactions on Systems, Man, and Cybernetics - Systems (past)
  - Associate Editor, IEEE Transactions on Learning Technologies (past)
  - Associate Editor, International Journal of Educational Data Mining (past)
  - Editorial Board, Educational Technology and Society Journal (past).
  - Editorial Board, Journal of Metacognition and Learning (past).
  - Editorial Board, International Journal of Smart Learning Environments
  - Associate Editor, IEEE Transactions on Knowledge and Data Engineering. (past)
  - Associate Editor, Applied Intelligence: The International Journal, Springer. (past)
  - Associate Editor, International Journal of Prognostics and Health Management.
  - Advisory Board, International Journal of Smart Learning Environments.
  - Editorial Board, International Journal of Artificial Intelligence in Education.
  - Editorial Board, Journal of Surveillance, Security and Safety.
  - Associate Editor, Research: AAAS/Science Partner Journal (China).