

David Byrd

MARVIN H. GREEN JR. ASSISTANT PROFESSOR OF COMPUTER SCIENCE

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Professional Experience

- 2024- **Marvin H. Green Jr. Assistant Professor of Computer Science**, Bowdoin College
- 2021- **Assistant Professor of Computer Science**, Bowdoin College
- 2014-2021 **Research Scientist II**, Georgia Institute of Technology
- 2011-2014 **Lead Designer/Developer**, Gizmodeus Games
- 2005-2011 **Director of Information Systems**, Hypercube
- 1996-2005 **Senior/Lead Software Developer**, Various: e-Train, MobileBriefs, KMC Telecom

Awards, Fellowships, & Grants

- 2025 **Best Paper Award**, AAAI Workshop on AI for Social Impact
- 2024- **Marvin H. Green Jr. Endowed Chair**, Bowdoin College \$ 4,000/yr
- 2022-2024 **Faculty Fellowship**, J.P. Morgan AI Research \$ 110,000
- 2022 **Best Paper Award**, ACM International Conference on AI in Finance
- 2022 **Unsolicited Gift in Support of Research**, U.S. Bank \$ 25,000
- 2019-2020 **PhD Fellowship**, J.P. Morgan AI Research \$ 189,000
- 2018 **Graduate Student Instructor of the Year**, School of Interactive Computing
- 2017 **Detecting Financial Market Manipulation**, National Science Foundation (Co-PI) \$ 330,000
- 2016 **Enhancing Communication for Dialysis Patients**, Coplon (Co-I) \$ 200,000
Pedometer Media Algorithm Development, Flextronics (Co-PI) \$ 79,098

Education

- Georgia Institute of Technology** *Atlanta, GA*
PHD COMPUTER SCIENCE 2021
 - Advisor: Dr. Tucker Balch
 - Dissertation: Supporting privacy preservation and normative alignment with multi-agent simulation
- Georgia Institute of Technology** *Atlanta, GA*
MS COMPUTER SCIENCE 2017
 - Specialization: Machine Learning
- Georgia Institute of Technology** *Atlanta, GA*
BS COMPUTER SCIENCE 2014

Publications

PEER-REVIEWED CONFERENCE PAPERS

- Byrd, D.** (2025, December). Multi-agent Market Simulation for Deep Reinforcement Learning With High-Frequency Historical Order Streams. In 2025 Winter Simulation Conference (WSC). ACM/IEEE.
- Byrd, D.** (2025, November). The Accidental Pump and Dump: When Agentic AI Meets Autonomous Trading. In Proceedings of the 6th ACM International Conference on AI in Finance (pp. 88-95). * **Oral Presentation** (15% acceptance rate)

- Xu, H., Bohne, J., Polak, P., **Byrd, D.**, Rosenberg, D., & Kazantsev, G. (2025, November). Learning to Trade with Preferences: Interpretable Execution via Mixture-of-Experts. In Proceedings of the 6th ACM International Conference on AI in Finance (pp. 762-770). * **Poster** (32% acceptance rate)
- Zhu, H., Vyetenko, S., Dwarakanath, K., Balch, T., Grundl, S., & **Byrd, D.** (2023, December). Once burned, twice shy? The effect of stock market bubbles on traders that learn by experience. In 2023 Winter Simulation Conference (WSC) (pp. 291-302). IEEE.
- Byrd, D.** (2022, November). Learning Not to Spoof. In Proceedings of the Third ACM International Conference on AI in Finance (pp. 139-147). * **Best Paper** (top 2%)
- Byrd, D.**, Mugunthan, V., Polychroniadou, A., & Balch, T. (2022, November). Collusion resistant federated learning with oblivious distributed differential privacy. In Proceedings of the Third ACM International Conference on AI in Finance (pp. 114-122).
- Shearer, M., **Byrd, D.**, Balch, T. H., & Wellman, M. P. (2021). Stability Effects of Arbitrage in Exchange Traded Funds: An Agent-Based Model. In Proceedings of the 2021 ACM International Conference on AI in Finance.
- Byrd, D.** & Polychroniadou, A. (2020). Differentially Private Secure Multi-Party Computation for Federated Learning in Financial Applications. In Proceedings of the 2020 ACM International Conference on AI in Finance.
- Vyetenko, S., **Byrd, D.**, Petosa, N., Mahfouz, M., Dervovic, D., Veloso, M., & Balch, T. H. (2020). Get Real: Realism Metrics for Robust Limit Order Book Market Simulations. In Proceedings of the 2020 ACM International Conference on AI in Finance.
- Byrd, D.**, Hybinette, M., & Balch, T. H. (2020). ABIDES: Towards High-Fidelity Multi-Agent Market Simulation. In Proceedings of the 2020 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (pp. 11-22).
- Hrolenok, B., Balch, T., **Byrd, D.**, Roberts, R., Kim, C., Rehg, J. M., Gilliland, S., & Wallen, K. (2018). Use of position tracking to infer social structure in rhesus macaques. In Proceedings of the Fifth International Conference on Animal-Computer Interaction (pp. 1-5).
- Thompson, B., Levy, L., Lambeth, A., **Byrd, D.**, Alcaininho, J., Radu, I., & Gandy, M. (2016). Participatory design of STEM education AR experiences for heterogeneous student groups: exploring dimensions of tangibility, simulation, and interaction. In 2016 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct) (pp. 53-58). IEEE.
- Bedri, A., **Byrd, D.**, Presti, P., Sahni, H., Gue, Z., & Starner, T. (2015). Stick it in your ear: Building an in-ear jaw movement sensor. In Adjunct Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers (pp. 1333-1338).

PEER-REVIEWED JOURNAL ARTICLES

- Roberts, R., Balch, T., **Byrd, D.**, Gilliland, S., Hrolenok, B., Rehg, J. A., & Wallen, K. (2022, September). Using Continuous 3D Tracking and Remote Video to Enhance Management of Social Groups of Rhesus Monkeys. In American Journal of Primatology (Vol. 84). 111 River St, Hoboken, NJ 07030-5774 USA: WILEY.
- Byrd, D.**, Bajaj, S., & Balch, T. H. (2019). Fund Asset Inference Using Machine Learning Methods: What's in That Portfolio?. The Journal of Financial Data Science, 1(3), 98-107.
- Gandy, M., Levy, L. M., Solomon, R., Lambeth, A., & **Byrd, D.** (2017). Designing "serious" games for older adults: a cognitive training case study. Innovation in Aging, 1(Suppl 1), 14-15.
- Bedri, A., Sahni, H., Thukral, P., Starner, T., **Byrd, D.**, Presti, P., Reyes, G., Ghovanloo, M., & Guo, Z. (2015). Toward silent-speech control of consumer wearables. IEEE Computer, 48(10), 54-62.

PEER-REVIEWED WORKSHOP PAPERS

- Byrd, D.** (2025, March). Exploring Sentiment Manipulation by LLM-Enabled Intelligent Trading Agents. AAAI 2025 Workshop on AI for Social Impact. * **Best Paper** (top 6%)
- Guo, Y., Polychroniadou, A., Shi, E., **Byrd, D.**, & Balch, T. (2022). MicroFedML: Privacy preserving federated learning for small weights. CRYPTO 2022 Workshop on Privacy Preserving Machine Learning.
- Byrd, D.** & Balch, T. H. (2020). Evidence of Rising Market Efficiency from Intra-day Equity Price Prediction. ACM SIGKDD International Conference on Knowledge Discovery & Data Mining Workshop on Machine Learning and Finance.
- Vyetenko, S., **Byrd, D.**, Petosa, N., Mahfouz, M., Dervovic, D., Veloso, M., & Balch, T. (2019) Get Real: Realism Metrics for Robust Limit Order Book Market Simulations. NeurIPS 2019 Workshop on Robust AI in Financial Services.

- Shearer, M., **Byrd, D.**, & Balch, T. (2019). Towards Explaining Exchange Traded Funds' Impact on Market Volatility Using an Agent-based Model. NeurIPS 2019 Workshop on Robust AI in Financial Services.
- Mugunthan, V., Polychroniadou, A., **Byrd, D.**, & Balch, T. (2019). SMPAI: Secure Multi-Party Computation for Federated Learning. NeurIPS 2019 Workshop on Robust AI in Financial Services.
- Balch, T., Mahfouz, M., Lockhart, J., Hybinette, M., & **Byrd, D.** (2019) How to Evaluate Trading Strategies: Single Agent Market Replay or Multiple Agent Interactive Simulation?. ICML 2019 Workshop on AI in Finance.

UNDER SUBMISSION - PREPRINT AVAILABLE

- Kurshan, E., Balch, T., & **Byrd, D.** (2025). The Agentic Regulator: Risks for AI in Finance and a Proposed Agent-based Framework for Governance. arXiv preprint arXiv:2512.11933.
- Kurshan, E., Balch, T., Mehta, D., & **Byrd, D.** (2025). AI Driven Fraud, Financial and Cybercrime: Emerging Threats and The Evolving Landscape of AI versus AI. Available at SSRN: abstract id 5385017.

INVITED TALKS

- Byrd, D.** (2025) Agent Intention, Communication, Collaboration, Competition: Technical, Social, and Economic Implications of Pervasive Agentic Computing. Invited expert contributor to this horizon-scanning Institute for Defense Analyses workshop.
- Byrd, D.** (2024) Learning Not to Spoof: Normative Guidance for Autonomous Trading Agents. Invited oral presentation at the 10th Annual Bloomberg-Columbia Machine Learning in Finance Conference.
- Byrd, D.** (2023) Learning Not to Spoof: Normative Guidance for Autonomous Trading Agents. Invited seminar at FINRA (Financial Industry Regulatory Authority) – the federal regulator of securities broker/dealers.
- Byrd, D.**, Hybinette, M., & Balch, T. (2020) Agent-Based Interactive Discrete Event Simulation. Alan Turing Institute: Market Simulation Workshop.
- Balch, T. & **Byrd, D.** (2019) Intra-day Equity Price Prediction using Deep Learning as a Measure of Market Efficiency. ICML 2019 Workshop on AI in Finance.
- Balch, T. & **Byrd, D.** (2017) Deep Q-Learning for Trading. QuantCon 2017.
- Byrd, D.** & Wilson, J. (2015) Augmented Reality for STEM Education. Year Up (nonprofit empowering urban youth).

OTHER PAPERS

- Byrd, D.** (2021). Responsible machine learning: supporting privacy preservation and normative alignment with multi-agent simulation. [PhD dissertation, Georgia Institute of Technology.] Available online from SMARTech repository, <http://hdl.handle.net/1853/65096>.
- Byrd, D.** (2019). Explaining agent-based financial market simulation. arXiv preprint arXiv:1909.11650.
- Byrd, D.** & Jones, B. (2016) Computationally-Efficient Pedometry. May 4, 2016, 19 pages.

Bowdoin Teaching Experience

Spr 2026	Financial Machine Learning , Instructor of Record	20 students
Spr 2026	Artificial Intelligence , Instructor of Record	25 students
Spr 2024	Financial Machine Learning , Instructor of Record	18 students
Spr 2024	Data Structures , Instructor of Record	24 students
Fall 2023	Artificial Intelligence , Instructor of Record	35 students
Fall 2023	Data Structures , Instructor of Record	19 students
Spr 2023	Financial Machine Learning , Instructor of Record	15 students
Spr 2023	Data Structures , Instructor of Record	23 students
Fall 2022	Artificial Intelligence , Instructor of Record	31 students
Fall 2022	Data Structures , Instructor of Record	20 students
Spr 2022	Financial Machine Learning , Instructor of Record	17 students
Fall 2021	Artificial Intelligence , Instructor of Record	30 students
Fall 2021	Introduction to Computer Science , Instructor of Record	30 students

Georgia Tech Teaching Experience

Fall 2019	Machine Learning for Trading , Instructor of Record	275 students
Sum 2018	Intro to Artificial Intelligence , Instructor of Record	60 students
Spr 2018	Machine Learning for Trading , Instructor of Record	90 students
Sum 2017	Intro to Artificial Intelligence , Instructor of Record	50 students
Sum 2017	Machine Learning for Trading , Instructor of Record	70 students
Spr 2017	Intro to Artificial Intelligence , Instructor of Record	140 students
Sum 2016	Machine Learning for Trading , Instructor of Record	50 students
Various	Machine Learning for Trading , Head Teaching Assistant, 7 semesters	

Research Mentoring

2023-2024	Darien Gillespie , Bowdoin College	Honors
2023-2024	Leopold Spieler , Bowdoin College	Honors
Spr 2024	Will Jorgensen , Bowdoin College	Indep. Study
Spr 2024	Alex Richardson , Bowdoin College	Indep. Study
Spr 2024	John Soeder , Bowdoin College	Indep. Study
Spr 2024	Luke Tingley , Bowdoin College	Indep. Study
Fall 2023	Zane Bookbinder , Bowdoin College	Indep. Study
Fall 2023	Rahul Dasgupta , Bowdoin College	Indep. Study
Sum 2023	Rahul Dasgupta , Bowdoin College	Faculty Award
Sum 2023	Will Jorgensen , Bowdoin College	Faculty Award
Sum 2023	William Warlick , Bowdoin College	Faculty Award
2022-2023	Angus Zuklie , Bowdoin College	Honors
Spr 2023	Crystal Chong , Bowdoin College	Indep. Study
Spr 2023	Cobra Curtis , Bowdoin College	Indep. Study
Spr 2023	Sofia Hamby , Bowdoin College	Indep. Study
Spr 2023	Sam Lakritz , Bowdoin College	Indep. Study

Professional Research Experience

RESEARCH SCIENTIST II

SELECTED PROJECTS

- 2018-2019 **Public Broadcasting Program Recommendations**, a collaborative filtering tool for PBS Passport video streaming service to improve engagement through personal content suggestions. GPB
- 2015-2017 **Computationally Efficient Pedometer**, a novel pedometer algorithm prototype for micro-wearable computational constraints. Flextronics
- 2015-2017 **Cycle Atlanta**, A mobile application allowing cyclists to easily map, track, and view information relevant to their trips around the Atlanta area. NSF
- 2015-2016 **Mobile Observation and Visualization Tool**, a tablet-based data collection tool for rapid, intuitive recording of observation and shadowing studies at military hospitals. MHS
- 2014-2016 **Food for Thought**, a research-oriented computer game designed to evaluate the effect of specific activities on overall cognitive function. NIDILRR
- 2015 **ARROW**, an augmented reality prototype designed to illustrate the use of novel technology to improve situational awareness training exercises. U.S. Marines
- 2014 **Augmented Reality for STEM Education**, a collection of interactive AR experiences designed to make learning science intuitive for children. Verizon Fdn

INVENTION DISCLOSURES

- 2019 **Stumpgrinder*: A Python-based discrete event simulation environment**,
Byrd, D. & Balch, T. * Now called ABIDES
- 2018 **A Contextually Aware Notification System**,
Gandy, M., Hollibaugh, A., Byrd, D., Sanders, M., Pearman, A., Presti, P., & Robertson, S.
- 2018 **GaitRate – A Mobile Application to Measure Gait Speed**,
Johnson, T., Byrd, D., Jones, B., Lambeth, A., Nadel, L., & Vandenberg, A.
- 2017 **INFORMED: Instant Functional Outcomes Report for Meaningful Encounters in Dialysis**,
Plantinga, L., Jones, B., Vandenberg, A., Nadel, L., Byrd, D., Lambeth, A., Johnson, J., & Bowling, C.
- 2016 **MOV iOS app: A tool for conducting behavior field studies**,
Robertson, S., Byrd, D., DuBose, J., Lim, L., & Zimring, C.

Professional Leadership Experience

POSITIONS / KEY ACHIEVEMENTS

Hypercube

Dallas, TX

DIRECTOR OF INFORMATION SYSTEMS

2005-2011

- Directed all IS, IT, automation efforts (& vendors); 8 (of 42) FTE, \$1.5MM budget
- Architected key systems: workflow, financial reporting, billing, automated network analysis
- Industry-first interactive visualization tool for call traffic
- Intelligent bill reconciliation system recovered \$100Ks
- Automation: company grew to > \$100MM/yr revenue w/ < 50 employees

KMC Telecom*Atlanta, GA***SENIOR SOFTWARE ENGINEER***2002-2005*

- Mentored junior / intermediate developers, educated non-technology business units
- Automated daily network map, equipment configuration (via automated crawler)
- FCC-regulated service order automation gateway (number portability)
- Led company-wide data reconciliation effort (AI records matching)

MobileBriefs*Atlanta, GA***LEAD DEVELOPER***2001-2002*

- Led all software development efforts (startup)
- Developed complete audio content pipeline automation system
- Intelligently created daily programs tailored to user's tastes and commute length

e-Train / Fred Pryor Seminars*Atlanta, GA***DIRECTOR OF ONLINE DEVELOPMENT***2000-2001*

- Led web initiative of world's largest corporate training provider; 12 FTE, \$2MM budget
- Managed cross-disciplinary team of developers, sysadmins, project managers, QA
- Led major systems upgrade project: requirements, software and database architecture, site framework

Outreach & Professional Development

ORGANIZING COMMITTEES

- 2025 **ACM International Conference on AI in Finance**, Program Co-Chair
- 2025- **ACM International Conference on AI in Finance**, Executive Committee member
- 2023-2024 **ACM International Conference on AI in Finance**, Proceedings Chair
- 2024 **AAAI Workshop on AI in Finance for Social Impact**, Committee Member

PROGRAM COMMITTEES

- *2020-2025 **ACM International Conference on AI in Finance**, Committee Member (*except 2021)
- 2022-2025 **ACM KDD Workshop on Machine Learning in Finance**, Committee Member
- 2020-2023 **AAAI Conference on Artificial Intelligence**, Committee Member
- 2022 **Journal of Systems Architecture**, Reviewer
- 2021-2022 **EPJ Data Science**, Reviewer
- 2019 **ICML Workshop on AI in Finance**, Committee Member

SERVICE AND OUTREACH

- 2026 **Bowdoin Student Fellowships Committee**, Committee Member
- 2026 **Hastings AI Workshop**, Session Presenter - Reinforcement Learning
- 2026 **Sophomore Bootcamp**, Panelist - AI in the Workplace
- 2023-2024 **Bowdoin Workday Student Campus Transition Committee**, Committee Member
- 2021-2024 **Bowdoin CS Faculty Hiring Committee**, Committee Member
- 2021-2022 **Bowdoin Machine Learning Student Group**, Advisor
- 2019-2020 **Georgia Tech Faculty Hiring Committee**, Committee Member
- 2014-2018 **GVU Demo Day**, Presenter
- 2016 **North Springs Charter High School annual STE(A)M showcase**, Presenter
- 2015 **CSE Group Expo**, Presenter
- 2015 **Wireless Technology Forum**, Presenter
- 2014 **Quantico Modeling & Simulation Facility Open House**, Presenter