Matthew Peveler

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Education

- **Rensselaer Polytechnic Institute** — Troy, NY
  Ph.D., Computer Science — *Nov 2020*
  Thesis: Building Cognitive and Immersive Systems: Architecture, Implementation, and Formalization
  Advisor: Selmer Bringsjord

- **The College of New Jersey** — Ewing, NJ
  Bachelor of Science, Computer Science — *May. 2013*
  Member of Upsilon Pi Epsilon, International Honor Society for Computing Sciences

Publications

- Briggs, S., Chabot, S., Sanders, A., **Peveler, M.**, Strzalkowski, T., and Braasch, J. (2022). Multiuser, multimodal sensemaking cognitive immersive environment with a task-oriented dialog system. In *2022 IEEE International Symposium on Technologies for Homeland Security (HST)*, pages 1–3, Boston, MA, USA. IEEE

- Briggs, S., **Peveler, M.**, Drozdal, J., and Braasch, J. (2022). Category Creation Between Digital and Analog Sensemaking Tools in a Cognitive Immersive Environment. In *Human Interface and the Management of Information: Visual and Information Design*, volume 13305, pages 451–460. Springer International Publishing, Cham

- Briggs, S., **Peveler, M.**, Drozdal, J., Su, H., and Braasch, J. (2021). Thematic Units Comparisons Between Analog and Digital Brainstorming. In *Human Interface and the Management of Information. Information Presentation and Visualization*, volume 12765, pages 257–267. Springer International Publishing, Cham

- **Peveler, M.**, Kephart, J. O., Mou, X., Clement, G., and Su, H. (2020). A Virtual Mouse Interface for Supporting Multi-user Interactions. In *Human-Computer Interaction. Multimodal and Natural Interaction*, volume 12182, pages 497–508. Springer International Publishing, Cham. Series Title: Lecture Notes in Computer Science

- **Peveler, M.**, Tyler, J., Nelson, D. B., Cerqueira, R., and Su, H. (2020). Browser Based Digital Sticky Notes for Design Thinking. In *Companion Publication of the 2020 ACM Designing Interactive Systems Conference*, pages 349–352, Eindhoven Netherlands. ACM

- Chabot, S., Drozdal, J., **Peveler, M.**, Zhou, Y., Su, H., and Braasch, J. (2020). A Collaborative, Immersive Language Learning Environment Using Augmented Panoramic Imagery. In *2020 6th International Conference of the Immersive Learning Research Network (iLRN)*, pages 225–229, San Luis Obispo, CA, USA. IEEE

- Divekar, R. R., Su, H., Kephart, J. O., DeBayser, M. G., Guerra, M., Mou, X., **Peveler, M.**, and Chen, L. (2020). HUMAINE: Human Multi-Agent Immersive Negotiation Competition. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, pages 1–10, Honolulu HI USA. ACM

- Maicus, E., **Peveler, M.**, Aikens, A., and Cutler, B. (2020). Autograding Interactive Computer Graphics Applications. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, pages 1145–1151, Portland OR USA. ACM

- Govindarajulu, N. S., Bringsjord, S., and **Peveler, M.** (2019). On Quantified Modal Theorem Proving for Modeling Ethics. *Electronic Proceedings in Theoretical Computer Science*, 311:43–49

- Briggs, S., Perrone, M., **Peveler, M.**, Drozdal, J., Balagyozyan, L., and Su, H. (2019). Multimodal, Multiuser Immersive Brainstorming and Scenario Planning for Intelligence Analysis. In *2019 IEEE*

International Symposium on Technologies for Homeland Security (HST), pages 1–4, Woburn, MA, USA. IEEE

- **Peveler, M.**, Kephart, J. O., and Su, H. (2019). Reagent: Converting Ordinary Webpages into Interactive Software Agents. In *Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence*, pages 6560–6562, Macao, China. International Joint Conferences on Artificial Intelligence Organization. Winner of Application Impact Award on Demonstration Track

- **Peveler, M.**, Briggs, S., Drozdal, J., Balagyozyan, L., Sun, C., Perrone, M., and Su, H. (2019). Translating the Pen and Paper Brainstorming Process into a Cognitive and Immersive System. In *Human-Computer Interaction. Recognition and Interaction Technologies*, volume 11567, pages 366–376. Springer International Publishing, Cham

- Maicus, E., **Peveler, M.**, Patterson, S., and Cutler, B. (2019). Autograding Distributed Algorithms in Networked Containers. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education - SIGCSE '19*, pages 133–138, Minneapolis, MN, USA. ACM Press

- **Peveler, M.**, Maicus, E., and Cutler, B. (2019). Comparing Jailed Sandboxes vs Containers Within an Autograding System. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education - SIGCSE '19*, pages 139–145, Minneapolis, MN, USA. ACM Press

- Briggs, S., Drozdal, J., **Peveler, M.**, Balagyozyan, L., Sun, C., and Su, H. (2019). Enabling Sensemaking for Intelligence Analysis in a Multi-user, Multimodal Cognitive and Immersive Environment. In *Proceedings of the Twelfth International Conference on Advances in Computer-Human Interactions*, pages 07–14, Athens, Greece. IARIA

- Divekar, R. R., **Peveler, M.**, Rouhani, R., Zhao, R., Kephart, J. O., Allen, D., Wang, K., Ji, Q., and Su, H. (2018). CIRA: An architecture for building configurable immersive smart-rooms. In *Advances in Intelligent Systems and Computing*, pages 76–95. Springer International Publishing

- **Peveler, M.**, Srivastava, B., Talamadupula, K., Sundar G., N., Bringsjord, S., and Su, H. (2018). Toward Cognitive-and-Immersive Systems: Experiments in a Cognitive Microworld. In *Proceedings of the Sixth Annual Conference on Advances in Cognitive Systems*, Pal Alto, California, USA

- **Peveler, M.**, Govindarajulu, N. S., and Bringsjord, S. (2018). Towards automating the doctrine of triple effect. In *Proceedings of the International Conference on Robot Ethics and Standards (ICRES 2018)*, Troy, New York, USA

- Bringsjord, S., Govindarajulu, N. S., Sen, A., **Peveler, M.**, Srivastava, B., and Talamadupula, K. (2018). Tentacular Artificial Intelligence, and the Architecture Thereof, Introduced. In *Proceedings of the Architectures and Evaluation for Generality, Autonomy & Progress in AI Workshop (AEGAP 2018)*, Stockholm, Sweden

- Govindarajulu, N. S., Bringsjord, S., Ghosh, R., and **Peveler, M.** (2017). Beyond the doctrine of double effect: A formal model of true self-sacrifice. In *Proceedings of the International Conference on Robot Ethics and Safety Standards (ICRESS2017)*, Lisbon, Portugal

- Sen, A., **Peveler, M.**, Marton, N., Ghosh, R., Licato, J., Radke, R. J., Woodstock, T.-K. A. E., Dong, B., O'Neil, K., Carter, T., and Bringsjord, S. (2016). Toward the cognitive classroom: Mathematical physics. In *In Proceedings of 6th European Immersive Education Summit*, Padua, Italy

- Arista, D., Bringsjord, S., **Peveler, M.**, Ghosh, R., Bello, P., and Licato, J. (2015). An algorithm for the pragmatic inference of relevance conditionals. Presented at *Model-Based Reasoning in Science and Technology. Models and Inferences: Logical, Epistemological, and Cognitive Issues (MBR15)*

Patents

- Kephart, J. O., Su, H., and **Peveler, M.** (U.S. Patent 11,442,991, Sept. 2022). Using Natural Language to Control Structured Web Page Data
- Kephart, J. O., Su, H., Bayser, M. G. D., de Vasconcelos Alberio Guerra, M., Divekar, R., **Peveler, M.**, Mou, X., and Chen, L. (U.S. Patent 11,437,017, Sept. 2022). Embodied Negotiation Agent and Platform

Presentations

- **Peveler, M.**, Kephart, J., and Su, H. (2018). Context-aware intention resolution. Talk given at RPI
- **Peveler, M.**, Breese, S., Maicus, E., Aikens, A., Cyrus, T., Dinella, E., Anderson, J., Barthelmess, J., Lee, M., Montealegre, L., Wang, J., Holzbauer, B., Cutler, B., and Milanova, A. (2018). Supporting team submissions and peer grading within submitty. Demo presented at ACM SIGCSE
- **Peveler, M.**, Srivastava, B., Talamadupula, K., Bringsjord, S., and G., N. S. (2017). Solving false beliefs for the cognitive room. Talk/Demo presented at RPI
- **Peveler, M.**, Tyler, J., Breese, S., Cutler, B., and Milanova, A. (2017). Submitty: An open source, highly-configurable platform for grading of programming assignments. Demo presented at ACM SIGCSE 2017

Posters

- Allen, W., Belsky, S., Kelly, B., Barela, J., **Peveler, M.**, and Cutler, B. (2022). Metrics for Student Classroom Engagement and Correlation to Software Assignment Plagiarism. In *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education V. 2*, pages 1141–1141, Providence RI USA. ACM
- **Peveler, M.**, Maicus, E., and Cutler, B. (2020). Automated and Manual Grading of Web-Based Assignments. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, pages 1373–1373, Portland OR USA. ACM
- Maicus, E., Patel, D., **Peveler, M.**, and Cutler, B. (2020). Random Input and Automated Output Generation in Submitty. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, pages 1372–1372, Portland OR USA. ACM
- **Peveler, M.**, Gurjar, T., Maicus, E., Aikens, A., Christoforides, A., and Cutler, B. (2019). Lichen: Customizable, Open Source Plagiarism Detection in Submitty. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education - SIGCSE '19*, pages 1270–1270, Minneapolis, MN, USA. ACM Press
- Aikens, A., Kumar, G., Patel, S., Maicus, E., **Peveler, M.**, and Cutler, B. (2019). Facilitating Discussion-Based Grading and Private Channels via an Integrated Forum. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education - SIGCSE '19*, pages 1270–1270, Minneapolis, MN, USA. ACM Press
- **Peveler, M.**, Kephart, J., and Su, H. (2018). Reagent: Converting ordinary webpages into interactive software agents. Poster presented at IBM AI Week
- **Peveler, M.**, Maicus, E., Holzbauer, B., and Cutler, B. (2018). Analysis of container based vs. jailed sandbox autograding systems. Poster presented at ACM SIGCSE 2018
- Breese, S., Maicus, E., **Peveler, M.**, and Cutler, B. (2018). Correlation of a flexible late day policy with student stress and programming assignment plagiarism. Poster presented at ACM SIGCSE 2018
- **Peveler, M.**, Srivastava, B., Talamadupula, K., Govindarajulu, N. S., Sen, A., Bringsjord, S., and Su, H. (2017). Towards cognitive-and-immersive systems: Experiments in a shared (or common) blockworld framework. Poster presented at IBM Cognitive Colloquium

- Tyler, J., **Peveler, M.**, and Cutler, B. (2017). A flexible late day policy reduces stress and improves learning. Poster presented at SIGCSE Conference
- **Peveler, M.**, O'Neil, K., Sen, A., Ghosh, R., Dong, B., and Bringsjord, S. (2016). The planning dilemma in cognitive computing for cisl's "cognitive boardroom". Poster presented at IBM Cognitive Colloquium
- Wong, A., Sihsobhon, B., Lindquist, M., **Peveler, M.**, Cutler, B., Breese, S., Tran, E., Jung, J., and Shaw, B. (2016). User experience and feedback on the rpi homework submission server. Poster presented at ACM SIGCSE 2016
- Sen, A., **Peveler, M.**, Marton, N., Ghosh, R., Licato, J., Radke, R. J., Woodstock, T.-K. A. E., and Bringsjord, S. (2015). Towards the cognitive classroom: Mathematical physics. Poster presented for CISL @ EMPAC Launch at RPI

Research Experience

- **Cognitive and Immersive Systems Laboratory at RPI** — Troy, NY
  Research Assistant — *Fall 2016 - Fall 2020*
  - Conducted research for resolution of intents and entities from multi-modal contexts.
  - Integrated different spatial context systems for gestural input to large-scale environments.
  - Acted as technology liaison between RPI and IBM labs.
  - Developed modules written in Node.js, and Python utilizing MongoDB, PostgreSQL, RabbitMQ, and Redis.
  - Implemented usage of the formal logic and reasoner to handle theory of mind reasoning of agents.
  - Created of Cognitive Polygon Framework for definition of tasks and cognitive agents in Blockworld-esque worlds.
  - Developed and created modular framework for building "Cognitive and Immersive Systems".
  - Formalized intelligent room behavior for use in plan and goal recognition algorithms.
  - Developed collaborative in-person technologies for intelligence analysis.
- **IBM - Brasil** — Rio de Janeiro, Brasil
  Pesquisador / Cientista - Junior (Junior Researcher) — *September 2019 – December 2019*
  - Developed a new digital sticky note tool for in-person design thinking meetings.
  - Created a multi-user pointing system utilizing cellphone sensors for large-scale wall displays.
  - Investigated camera-based approach for interacting with large-scale wall displays using transparent markers and multiplexing.
  - Created and ran several user studies judging effectiveness of designed interfaces based on NASA Task Load Index.
  - Contributed 33 patches to the IBM Watson Node.js SDK libraries.

Work Experience

- **TigerData (Formly Timescale)** — Remote
  Sr. Software Engineer 2 — *Apr 2024 - Present*
  - Helped develop internal LLM based agents to assist employees answer support questions and project progress tracking.
  - Developed internal tool to perform GEO analysis for the company.
  - Helped develop pgai semantic catalog for text-to-sql use cases
  - Helped unify aspects of the Timescale web console and PopSQL cloud products.
  - Helped develop AI assistant features in PopSQL.
  - Worked on assorted bugfixes, features, and tech debt in Timescale web console (React) and PopSQL products.
- **PopSQL** (acquired by Timescale) — Remote
  Software Engineer — *Nov 2020 - Mar 2024*
  - Worked across the entire stack (Ruby on backend, TypeScript/React for frontend) to deliver new features and fix bugs.
  - Helped architect new system to handle cloud database connections and streamed queries to reduce execution time and memory overhead.
  - Helped develop various internal practices and procedures around developing the codebase.
  - Improved various front-end efficiency bottlenecks through algorithmic analysis.

- Worked on developing new and improving existing database adapters.
- Developed prototype dbt integration for the core product.
- Helped manage underlying infrastructure as defined through Terraform.
- Helped mentor junior engineers on the team.

- **Rensselaer Polytechnic Institute** Troy, NY
  Teaching Assistant *Fall 2013 – Spring 2015*
  - Ran labs and held office hours for Computer Science I.
  - Acted as head TA for professor from Fall 2014 to Spring 2015.
  - As head TA, helped professor manage other TAs, setup submission and grading for HWs, labs, and tests, dealt with cheaters, and other miscellaneous tasks.

- **Pitney Bowes** Troy, NY
  Software Development Intern *June 2014 – Dec 2015*
  - Worked on fixing bugs and improving testing efforts of the Location Intelligence module of Spectrum Spatial.
  - Researched porting XML based test suites to native JUnit test suites.
  - Created JUnit extensions for parametrized testing to simplify adding new data providers for testing.
  - Implemented 9 functions to Spectrum Spatial's SQL dialect.

Open Source Projects

- **Submitty** (https://submitty.org): Assignment submission and auto-grading server for Computer Science written using mix of PHP, Python, Bash, and C++.
- **phinx** (https://github.com/cakephp/phinx): Framework agnostic database migration software written in PHP.
- **asciidoc-py** (https://github.com/asciidoc-py/asciidoc-py): Python client for parsing AsciiDoc files into HTML and DocBook.
- **BishopCAIS** (https://github.com/bishopcais): Modular framework for building "Cognitive and Immersive Systems", written in TypeScript and Python.
- **Slate** (https://github.com/slatedocs/slate): Static API site generator written in Ruby, HTML, and JavaScript.
- **pypdf** (https://github.com/py-pdf/pypdf): Pure python library for manipulating PDFs.
- **sqlectron** (https://github.com/sqlectron/sqlectron-gui): Desktop SQL client written using TypeScript, React, and Electron.
- **HUMAINE** (https://github.com/humaine-anac): Competition framework written in Node for running multi-agent negotiation against a human.