Marko J. Sterbentz

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EDUCATION

Northwestern University — Evanston, IL
Ph.D. Computer Science, GPA 4.0/4.0 — Sep. 2019 – Present

University of Southern California — Los Angeles, CA
M.S. Computer Science, GPA 3.83/4.0 — May 2019

Idaho State University — Pocatello, ID
B.S. Computer Science with Mathematics minor, GPA 3.99/4.0 — May 2017

WORK and RESEARCH EXPERIENCE

Northwestern University — Evanston, IL
Ph.D. Researcher – advised by Dr. Kristian Hammond — Sep. 2019 – Present

- Investigating methods for deriving information and answering questions from heterogenous data sources including text documents, knowledge graphs, and relational databases.
- Leveraging language modeling and semantic parsing techniques for question understanding and multi-document information retrieval and reasoning.
- Co-designing and implementing a conversational question answering system that uses question decomposition techniques to determine how to retrieve and analyze data found in text corpora and knowledge graphs and respond to the user with the information that was produced.

Lawrence Livermore National Laboratory (LLNL) — Livermore, CA
Software Engineering Intern — May 2019 – Aug. 2019

- Developed a new software component using C++ and Python for performing material interface reconstruction.
- Integrated code into LLNL's open-source HPC framework Axom using best software engineering practices.
- This project is open source and the code is available on GitHub.

Idaho National Laboratory (INL) — Idaho Falls, ID
Visualization Research Intern — May. 2018 – Aug. 2018

- Enhanced an INL volume visualization system using C#, HLSL, and compute shaders in the Unity game engine.
- Utilized raymarching in tandem with a specialized data format to enable interactive visualization of exascale data in immersive environments.
- Presented associated research paper at PEARC18 conference in July 2018.

Visualization Research Intern — May. 2017 – Aug. 2017

- Developed software using the Unity game engine in C#, HLSL, and compute shaders for real-time rendering of exascale volume data for use in immersive virtual reality environments and conventional desktops.
- Collaborated with lab researchers to ensure this software would satisfy their use cases and practical requirements.

Visualization Research Intern — May. 2016 – Aug. 2016

- Built software components in Java and C++ for a large-scale data streaming and rendering platform.
- Coordinated with other developers using agile development techniques and git.
- Conducted in-depth presentations/demonstrations of the INL's computer aided virtual environment (CAVE) 3-D visualization capabilities onsite and in local classrooms.

Visualization Research Intern May. 2015 – Aug. 2015

- Generated improved interfaces using C++ and the Virtual Reality User Interface API for immersive visualization software.
- Aided in setup of remote collaboration tools to be utilized by researchers using the CAVE.

Visualization Research Intern May. 2014 – Aug. 2014

- Created a new immersive visualization application in C++ that was capable of rendering both LiDAR and 3-D models simultaneously.
- Implemented additional control features, basic animations, scaling, and positioning of models.

Idaho State University Pocatello, ID

Undergraduate Research Intern Nov. 2015 – May 2017

- Wrote software in C++ that interfaced with the Velodyne VLP-16 LiDAR sensor, extracted the useful information from incoming data packets, and registered data points using an iterative closest point algorithm.
- Added functionality to extract data from an inertial measurement unit (IMU), send it over a wireless network, and recreate the scanned environment on the user's laptop in real time.
- Constructed initial plan to meet the project goals in terms of hardware, software, and output required.
- Work performed as part of a study to determine the state of plant life in Idaho utilizing unmanned aerial vehicle LiDAR data.
- Funded by NSF / Idaho EPSCoR as part of the MILES Undergraduate Research Internship Program.

TEACHING EXPERIENCE

Northwestern University Evanston, IL

Teaching Assistant Sept. 2020 – Dec. 2020

- Assisted the professor in running and organizing the Practicum in Intelligent Information Systems course.
- Answered students' questions pertaining to the course material.

University of Southern California Los Angeles, CA

Teaching Assistant / Course Producer Aug. 2018 – May 2019

- Assisted the professor in teaching the graduate level Multimedia Systems Design course.
- Tutored students and provided guidance on the course material.
- Prepared code and data for course assignments. Graded homework, exams, and final projects.

VOLUNTEER EXPERIENCE

CS PhD Advisory Council Buddy Program Evanston, IL

Peer Mentor Sept. 2021 – present

- Mentored and advised two new PhD students in Northwestern University's CS department.

Viterbi Graduate Mentorship Program Los Angeles, CA

Peer Mentor June 2018 – May 2019

- Mentored and advised two new graduate students in the USC Viterbi School of Engineering's CS department.

Google IgniteCS Pocatello, ID

Program Mentor Aug. 2016 – April 2017

- Co-wrote the initial grant proposal to Google and obtained funding for a mentorship program to teach children from underrepresented groups in computer science how to write code.
- Instructed high school students in basic programming techniques through the use of the Scratch programming language and hosted an additional coding workshop for local elementary school students.

SKILLS and PROFICIENCIES

Programming Languages: Python, C/C++, Java, C#, Javascript, Lisp
Technologies / Frameworks: SpaCy, NLTK, SQL, OpenCV, OpenGL/WebGL, Unity, Git

AWARDS, HONORS, and GRANTS

2017 – University of Southern California Viterbi Dean's Scholarship
2017 – Idaho State University College of Science and Engineering High Honors Designation
2016 – MURI Program and research funding award sponsored by the National Science Foundation/Idaho EPSCoR
2016 – Google IgniteCS Grant for community mentorship program
2015 – MURI Program and research funding award sponsored by the National Science Foundation/Idaho EPSCoR
2014 – Idaho National Laboratory Intern Poster Session, Overall, 2nd Place Award
2014 – Idaho National Laboratory Intern Poster Session, Best Oral Presentation, 2nd Place Award
2014 – Center for Advanced Energy Studies (CAES) Energy Scholar Award
Idaho State University College of Science and Engineering Dean's List – 8 of 8 semesters
2013 – Idaho National Laboratory Scholarship Recipient – top tier
2013 – Idaho State University Presidential Scholarship

LEADERSHIP and PROFESSIONAL AFFILIATIONS

2018 – present: Member of Association for the Advancement of Artificial Intelligence (AAAI)
2013 – present: Member of Association for Computing Machinery (ACM)
2016 – 2017: President of the ISU Math/CS Club
2014 – 2016: Secretary of the ISU Math/CS Club
2013 – 2014: Secretary of the ISU Green-Up Club

PUBLICATIONS

Andrew Paley, Andong L. Li Zhao, Harper Pack, Sergio Servantez, Rachel F. Adler, **Marko Sterbentz**, Adam Pah, David Schwartz, Cameron Barrie, Alexander Einarsson, and Kristian Hammond. "From Data to Information: Automating Data Science to Explore the U.S. Court System." In *Proceedings of the Eighteenth International Conference on Artificial Intelligence and Law*. 2021. [**Peter Jackson Award for Best Innovative Application Paper**]

James H. Money, **Marko Sterbentz**, Nathan Morrical, Thomas Szewczyk, and Landon Woolley. "GPGPU Enabled Ray Directed Adaptive Volume Visualization for High Density Scans." In *Proceedings of the Practice and Experience on Advanced Research Computing*. 2018.

CONFERENCES, POSTER SESSIONS, and PRESENTATIONS

M. Sterbentz, K. Weiss. Improving Multi-Material Simulations: A Material Interface Reconstruction Component in Axom. *Lawrence Livermore National Laboratory Intern Expo and Poster Session.* Livermore, CA, August 2019.

M. Sterbentz, J. Money. GPGPU Enabled Adaptive Volume Visualization Using Commodity Game Engines. *Idaho National Laboratory Intern Expo and Poster Session.* Idaho Falls, ID, August 2018.

M. Sterbentz. Large Scale Adaptive Volume Visualization Using GPGPU Techniques and Commodity Game Engines. *Idaho National Laboratory Technical Presentation.* Idaho Falls, ID, July 2018.

M. Sterbentz, M. Johnson, A. Syal, R. Chugh, P. Taneja, J. Tang. Prismo: An Affective Computing Platform Built for Microsoft Hololens. *USC Games Expo 2018*. Los Angeles, CA, May 2018. [http://prismo-ar.com/]

M. Sterbentz, J. Money. Adaptive Volume Rendering for Exascale Data Using Immersive Environments. *Idaho National Laboratory Intern Expo and Poster Session.* Idaho Falls, ID, August 2017.

G. Cochrane, M. Sterbentz, J. Edwards. Real-Time LiDAR Terrain Mapping and Analysis. *ISU Undergraduate Research Symposium 2017.* Pocatello, ID, April 2017.

G. Cochrane, M. Sterbentz, J. Edwards. Real-Time LiDAR Terrain Mapping and Analysis. *Idaho EPSCoR Annual Meeting 2016.* Coeur d'Alene, ID, October 2016.

M. Sterbentz. Enhancing Scientific Research with Virtual Reality. *Math/CS Club Science, Math, Engineering, and Related Fields (SMERF) Talks*. Pocatello, ID, October 2016.

M. Sterbentz, J. Money. LIVE2: An Engine for Dynamic and Distributed Visualization. *Idaho National Laboratory Intern Expo and Poster Session.* Idaho Falls, ID, August 2016.

G. Cochrane, M. Sterbentz, J. Edwards. Real-Time LiDAR Terrain Mapping and Analysis. *Idaho Conference on Undergraduate Research (ICUR)*. Boise, ID, July 2016.

M. Sterbentz, E. Whiting. Dynamic Data Manipulation in the CAVE. *Idaho National Laboratory Intern Expo and Poster Session*. Idaho Falls, ID, August 2015.

M. Sterbentz, E. Whiting. Building a Hybrid Model Viewer to Enhance the Capabilities of the Computer Assisted Virtual Environment. *Idaho National Laboratory Intern Expo and Poster Session*. Idaho Falls, ID, August 2014.

ACADEMIC SERVICE

2020: Reviewer for Neural Information Processing Systems (NeurIPS)
2020: Reviewer for Empirical Methods in Natural Language Processing (EMNLP)
2020: Supervised 27 Northwestern computer science undergraduates on machine learning and data science projects
2018: Session Chair of Data Analytics / Deep Learning Session at Practice and Experience on Advanced Research Computing ’18 Conference. Pittsburgh, PA. July 22 – 26, 2018.

RELEVANT COURSEWORK

Graduate

CS 349: Machine Learning
CS 337: Natural Language Processing
EE 435: Deep Learning Foundations from Scratch
CS 371: Knowledge Representation and Reasoning
CS 496: Conversational Interfaces
CS 496: Data Science Seminar
CS 497: Computational Creativity
CS 325: Artificial Intelligence Programming
CS 496: AI Perspectives
CS 397: Seminar in Statistical Language Modeling
CSCI 561: Foundations of Artificial Intelligence
CSCI 534: Affective Computing
CSCI 585: Database Systems
CSCI 570: Analysis of Algorithms
CSCI 599: Special Topics: Immersive Environments
CSCI 520: Computer Animation and Simulation
CSCI 621: Digital Geometry Processing
CSCI 576: Multimedia Systems Design

Undergraduate

CS 4499: Advanced Computer Graphics
CS 4492: Special Problems in Computer Science
CS 4488: Advanced Software Engineering Project
CS 4477: Operating Systems
CS 4481: Compilers
CS 3385: Data Structures and Algorithms
INFO 4411: Intermediate Information Assurance
INFO 4407: Database Design and Implementation
INFO 3380: Networking and Virtualization
INFO 3307: Systems Analysis and Design
MATH 3326: Elementary Analysis
MATH 3352: Introduction to Probability
MATH 3360: Differential Equations
MATH 3350: Statistical Methods
MATH 2275: Calculus III
MATH 2240: Linear Algebra