LUCAS A. WEISSMAN

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EDUCATION

Williams College Williamstown, MA
Bachelor of Arts in Computer Science (CS), Minor in Science and Technology Studies (STS) *Aug. 2020 – Jun. 2024*

- **Relevant Courses in (CS):** Machine Learning, Natural Language Processing, Discrete Math, Statistics, Data Science, Linear Algebra, Algorithm Design and Analysis, Programming Languages.
- **Relevant Courses in (STS):** Socially Responsible Artificial Intelligence, Automation in the Unequal Society, Aesthetics of Automation: From the Mechanical Turk to A.I, and Minds, Brains, and A.I – Intelligent Behavior: Cognitive Science.

Budapest University of Technology and Economics (BME) Budapest, Hungary
(Software Engineering Exchange Program) *Aug. 2022 – Dec. 2022*

- **Relevant Courses:** Mobile Software Development, User Experience Design, Scalable Systems and Development Processes, Entrepreneurship, and Hungarian.

Broward College Pembroke Pines, FL
Associates of Arts in Computer Science (CS) *Jan. 2017 – Jun. 2019*

- **Relevant Courses in CS:** Introduction to Programming, Multivariable Calculus I & II, Engineer Physics with Calculus I & II, Public Speech (Honors).

- **Study Abroad** Sri Lanka
  (Leadership & Cross-Cultural Traditions Exchange Program) *Summer 2018*

RESEARCH EXPERIENCE

Undergraduate Researcher Assistant Providence, RI
Language Understanding and Representation Lab, Brown University Jun. 2023 – Aug. 2023
Advisor: Dr. Ellie Pavlick

- Researched Stable Diffusion and DALL-E models for compositional fidelity in image generation, leveraging TensorFlow, PyTorch, and CUDA to analyze VAE, U-Net, tokenizer, and CLIP-based text encoder pipelines.
- Developed structured datasets and Python-based JSON prompts for systematic trials, manually evaluating model outputs to assess concept binding and fidelity across single-object, relational, and multi-relational-object scenarios.
- Executed multi-step inference processes with K-LMS schedulers, analyzing denoising efficacy and latent-space decoding consistency for scalability in generative model outputs.

National Science Foundation (REU) Fellow Providence, RI
Computer Vision Lab, Brown University Jun. 2022 – Aug. 2022
Advisor: Dr. James Tompkin

- Researched GPT-3's context window limitations, analyzing its ability to maintain coherence and relevance in abstractive summarization of extended inputs.
- Investigated the impact of semantic perturbations on GPT-3 summaries, identifying biases and shifts in topical alignment and sentiment polarity through TF-IDF, sentiment, and polarity analyses on WikiHow datasets.
- Highlighted the need for bias-resilient summarization models, proposing expanded datasets and diversified perturbation testing to address limitations in language model robustness.

Undergraduate Researcher Intern Providence, RI
A.I for Computational Creativity, Brown University and Google Research (exploreCRS) Feb. 2022 – May. 2022
Advisor: Dr. James Tompkin

- Researched an AI-driven captioning system integrated into a Unity-based virtual environment, simulating real-time caption generation for artworks using MS-COCO datasets and CLIP models.
- Analyzed cloud-based AI captioning systems, identifying limitations in latency and dataset generalization, and proposed future improvements, including specialized datasets and locally-deployed AI models.
- Demonstrated a proof of concept in a museum-like virtual environment, leveraging raycasting for user interaction tracking and highlighting accessibility enhancements, earning recognition as "Best Creative Research Project."

Artificial Intelligence Research Intern Boston, MA

WorldCare Healthcare, Winter Internship Jan. 2022 – Feb. 2022

- Investigated scalable Retrieval-Augmented Generation (RAG) pipelines for automating the analysis of unstructured medical data, utilizing TensorFlow, NLTK, Spark, and OCR.
- Conducted extensive literature reviews and analyzed medical coding systems (ICD-10-CM, CPT, SNOMED CT) to assess their interpretability and applicability in NLP pipelines for healthcare.
- Evaluated ethical and regulatory compliance challenges in AI-driven healthcare systems and analyzed medical workflows to propose improvements for diagnostic precision.
- Researched integration gaps in multi-modal data systems and explored potential advancements to enhance real-time decision-making capabilities in medical diagnostics.

PROJECTS

Twined: Knowledge Programming Language Spring – 2024

Tech Stack: F#, Giraffe, SVG, JavaScript, HTML, and CSS

Advisor: Dr. Daniel W. Barowy

- Designed and implemented a formal syntax and semantic structure using BNF to define nodes and edges in knowledge graphs, ensuring consistent and intuitive representation of relationships in textual data.
- Developed a graph visualization web tool using F#, SVG, and Giraffe, incorporating a parser for structured text inputs to generate abstract syntax trees (AST) and render interactive, scalable knowledge graphs.
- Integrated unit tests and evaluation routines to validate the correctness of syntax parsing, semantic analysis, and graph generation, ensuring reliability and accuracy in handling complex data structures.

Arbitrarily Long Context for Question Answering Tasks Spring – 2023

Tech Stack: Python, Longformer, BART, Qasper Dataset, PyTorch, ROUGE Metrics

Advisor: Dr. Katherine A. Keith

- Developed an NLP pipeline combining BART summarization and Longformer QA to address context window limitations and enable cross-paragraph reasoning.
- Designed a preprocessing module to summarize lengthy contexts into concise representations, preserving critical references and ensuring compatibility with QA model input constraints.
- Evaluated system performance on the Qasper dataset using metrics like F1 Score for QA accuracy and ROUGE for summarization, addressing challenges such as diverse question types and multi-paragraph evidence extraction.
- Proposed methodologies for future advancements, including human-annotated baselines and improved evaluation strategies to enhance long-context QA capabilities.

DeepAutomata: AI-Powered Android Mobile App Fall – 2022

Tech Stack: Kotlin, Retrofit, OpenAI API, Jetpack Navigation, ViewModel, Material Design

Advisor: Dr. Péter Ekler

- Developed an Android application with Jetpack components, integrating OpenAI API via Retrofit and coroutines for text generation, summarization, and classification.
- Designed a modular navigation system using Fragments, NavController, and RecyclerView with GridLayoutManager for dynamic and scalable multi-pane layouts.
- Created an animated splash screen with AnimationUtils, employing immersive mode and custom transitions to enhance user onboarding and retention.

Data-Driven Discovery: Identifying Successful Cities with Machine Learning Spring – 2022

Tech Stack: Python, Plotly, GeoPandas, Scikit-learn

Advisor: Dr. Marina Barsky

- Combined and standardized four large-scale datasets, including socio-economic, and migration indicators for U.S. counties. Addressed missing data and reduced dimensionality to enhance clustering performance and analysis.
- Implemented K-Means, Hierarchical Clustering, and DBSCAN to categorize counties into four clusters, uncovering critical success factors like economic diversity and migration trends. Achieved strong clustering performance with a K-Means silhouette score of 0.65 and 61% similarity to hierarchical methods.
- Designed dynamic visually map representations for clustering insights across U.S. county geographies with FIPS-based location.

WORK EXPERIENCE

Software Product Developer Intern San Francisco,CA
Kountable, Remote Winter Internship Jan. 2023 – Feb. 2023
Mentor: Christopher Hale

- Designed and iterated wireframes and mockups in Figma, applying IBM Design Thinking principles such as hierarchy of information, color contrast, and responsive design to create intuitive and accessible user experiences.
- Leveraged IBM Enterprise Design Guidelines to implement standardized design components and interaction patterns, optimizing scalability, cross-platform consistency, and compliance with enterprise-level accessibility and usability standards across wireframes and prototypes.
- Developed a comprehensive pitch deck outlining design concepts, user journeys, product roadmaps, and tech stack recommendations, including cost and timeline estimates, to align stakeholders and guide decision-making.
- Reported directly to the CEO and CFO to ensure alignment with strategic goals.

Big Data Analyst Intern Pensacola, FL
Institute for Human & Machine Cognition (IHMC), Remote Summer Internship Jun. 2021 – Aug. 2021
Mentor: Larry Bunch, Jairun Diemer

- Analyzed and visualized large-scale NetFlow datasets using PySpark and Hadoop in Jupyter Notebook, producing histograms, scatter plots, and granular insights from network traffic patterns.
- Employed chunking of large datasets and leveraged parallel processing with Pandas to enhance data manipulation and achieve faster processing speeds.
- Researched MapReduce workflows for distributed computing for improving the scalability and performance of large-scale NetFlow dataset processing.

New Student Orientation Leader Pembroke Pines, FL
Broward College Admissions & Academic Advisement Department Jul. 2017 – Jul. 2019

- Designed and implemented orientation programs to support the successful onboarding of first-time college students.
- Conducted orientations for over 2,000 new students annually, serving as a key representative for first-time college attendees.
- Assisted students with course enrollment decisions, providing personalized academic advisement and reviewing registration processes.
- Partnered with the Admissions Office to provide guidance and support to prospective and newly admitted students, ensuring a seamless transition to college life.

PRESENTATIONS & POSTERS

1. **Weissman, Lucas A.**, Gu, K., Shu, Ye. "*Arbitrarily Long Context for Question Answering Tasks."* Williams College Computer Science Symposium, poster: May, 2023.
2. **Weissman, Lucas A.**, Chen, C., Patel, R., Tompkin, J. "*Using Topic-Focused Summarization to Understand Generated Abstractive Summaries of Language Models."* The Leadership Alliance National Symposium & Brown University CS Undergraduate Research Symposium, July & August, 2022.
3. **Weissman, Lucas A.**, Bouabid, M., Stevens, L., Steigelman, J,. " *Towards AI-Guided Accessible Learning Spaces in Virtual Reality."* 7th Annual Brown University CS Undergraduate Research Symposium, poster & demo: May, 2022.
4. **Weissman, Lucas A.,** Apa, Andrea. "*How International Students Shape American Higher Education.*" Florida Consortium for International Education, October, 2018.
5. **Weissman, Lucas A.,***"Traveling Around the World."* Broward College, November, 2017.

SKILLS

Languages: Python, Java, C, C++, Kotlin, SQL (PostgreSQL), JavaScript, HTML/CSS, R, TypeScript, Tailwind
ML & AI Frameworks: TensorFlow, PyTorch, Keras, Scikit-learn, Hugging Face Transformers, OpenCV, Stable Diffusion
Libraries: pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly
Frameworks: Flask, FastAPI, Node.js, React, Bunx.
Developer Tools: Git, Docker, VS Code, Eclipse, Android Studio.
Creative Tools: Unreal Engine, Blender, Figma, Adobe Suite, Unity, OpenGL, Three.js, Oculus SDK, Meta Quest.
Cloud & Distributed Computing: Spark, Hadoop.

GRANTS & SCHOLARSHIPS

- **Jack Kent Cooke –** Internship Stipend 2022
- **National Science Foundation (NSF) – Research Experiences for Undergraduates** 2022
- **Brown University & Hult International Business School** – Entrepreneurship Bootcamp 2022
- **Williams College Travel Grant:** Independent project funding. 2023
- **Williams College Exchange Program:** Budapest University of Technology and Economics. 2022
- **Jack Kent Cooke –** Undergraduate Transfer Scholarship 2019
- **Phi Theta Kappa Honor Society** – Conference Stipend 2019
- **Robert "Bob" Elmore Honors College –** Exchange Program Grant 2018

CONFERENCES

- **Brazil Conference** – Exploring Brazil's Future. Harvard & M.I.T. Boston, MA, Apr. 2024
- **ACL 2023 Conference** – Advancements in Computational Linguistics Vancouver, Canada, 2023
- **The Leadership Alliance –** Exploring Brazil's Future Hartford, CT, Jul. 2022
- **IEEE Quantum Computing & Engineering** – International Conference on Innovation Webinar, Sep. 2021
- **Brazil Conference** – Exploring Brazil's Future. Harvard & M.I.T Boston, MA, Apr. 2019
- **Phi Theta Kappa Annual Convention** – Honor Society Leadership and Academics Kansas City, Apr. 2018
- **Campus Party Brazil** – Technology and Innovation Conference São Paulo, Brazil, Jan. 2013

WORKSHOPS & TALKS

- **Brazil Conference –** Attended *"How AI Can Revolutionize Brazil's Justice System"* with Luiz Fux, and *"Brazil in the Age of AI: Global Positioning and Challenges"* with Marcelo Mattar
- **ACL 2023** – Participated in Paper Tutorial *"Complex Reasoning in Natural Language"* by Wenting Zhao et al., and *"Retrieval-Based Language Models and Applications"* by Akari Asai et al
- **Brown University (NSF REU)** :
  Led a study group on *"Chain of Thought Prompting in LLMs"*, focusing on a paper exploring intermediate result generation and few-shot prompting for reasoning in multi-step tasks
  Attended a robotics workshop at the Watson Center, programming Boston Dynamics' robot, Spot, and using Choreographer software to design complex movements and control robotic functionalities

SERVICE & OUTREACH

- President, Phi Theta Kappa Honors Society – Alpha Delta Rho Chapter, Broward College May 2017 – June 2018
- President, International Student Organization, Broward College Mar. 2017 – Mar. 2018
- President, Honors Student Committee, Broward College Apr. 2018 – Jun. 2019
- Volunteer, Elementary School, Province of Uva, Sri Lanka Summer 2018
- Volunteer, Orphanage of Mother Theresa of Calcutta, Kandy, Sri Lanka Summer 2018
- Volunteer, Relay for Life, Florida, Broward College Fall 2016
- Student Ambassador, Broward College Student Life Department Aug. 2016 – May 2017
- Public Relations Officer, Student Government Association, Broward College Jan. 2017 – May 2017

HONORS & AWARDS

Best Creative Research Project – *Brown University CS Undergraduate Research Symposium* 2022
Student Leadership Award – *International Student Association* 2018
Honors Student Committee – *The Robert "Bob" Elmore Honors College* 2018
Organization of the Year – International Student Organization 2018
Outstanding Delegation Award – *Florida Model United Nations Competition* 2017
Member of the Year – *Phi Theta Kappa Honor Society* 2017

FOREIGN LANGUAGES

Fluent in **English, Portuguese,** and **Spanish,** with beginner proficiency in **Italian** and **Hungarian.**

Last Updated: January 07, 2025