Cameron Braunstein

Kantstraße 14, 66111 Saarbrücken

(+1) 978 866 0453 | cameronbraunstein@gmail.com | github.com/CameronBraunstein | linkedin.com/in/cameron-braunstein-1a38801b8/

Summary

I am currently a Ph.D. candidate in Computer Science at Saarland University. I am supervised by Professor Eddy Ilg and Professor Mariya Toneva, as a member of the Research Training Group ***Neuroexplicit Models of Language, Vision, and Action***. My goal is to develop explainable vision-language AI models which are well aligned with human cognition.

Education

Ph.D. in Computer Science — *Saarbrücken, Germany*

Saarland University — *October 2023 - Present*

- **Thesis Topic: Neuroexplicit Vision-Language Models** Supervised by Professor Eddy Ilg and Professor Mariya Toneva.
- **Affiliated Research Departments:** Computer Vision and Machine Perception Lab (CVMP) at Saarland University, Bridging AI and Neuroscience group (BrAIN) at the Max Planck Institute for Software Systems (MPI-SWS)

M.Sc. in Data Science and Artificial Intelligence, Specializing in Visual Computing — *Saarbrücken, Germany*

Saarland University — *October 2021 - September 2023*

- **GPA: 1.5 / 4.0 (best: 1.0, worst 4.0)**
- **Thesis Topic: Quantum Stereo Matching** Derived novel algorithm for stereo matching with using an adiabatic quantum computer, with demonstrable advantages over the previous state of the art. Published thesis research in the International Conference on 3D Vision, 2024. Supervised by Professor Eddy Ilg and Dr. Vladislav Golyanik.
- **Affiliated Research Departments:** Computer Vision and Machine Perception Lab (CVMP) at Saarland University, Visual Computing and Artificial Intelligence Department at the Max Planck Institute for Informatics (MPII)
- **Relevant Coursework:** High Level Computer Vision, Seminar in 3D Object Representation and Reconstruction with Machine Learning, Image Processing and Computer Vision, Differential Equations in Image Processing and Computer Vision, AI Planning, Automated Knowledge Base Construction

B.A. in Computer Science and in Mathematics — *Waltham MA, United States*

Brandeis University — *August 2015 - May 2019*

- **GPA: 3.8 / 4.0 (best: 4.0, worst 0.0)**
- **Honors:** ***Magna cum laude***, **Phi Beta Kappa Honor Society**, recipient of the Max Kade Travel Grant from the Center for German and European Studies
- **Exchanges:** Participated in the Brandeis-India Science Scholars Program, studying at the Indian Institute of Science in Bangalore from January to April 2018
- **Relevant Coursework:** Machine Learning, Differential Equations, Multivariable Calculus, Linear Algebra, Capstone Software Engineering

Professional Experience

OSCAR Computer Algebra System — *Kaiserslautern, Germany*

Open Source Contributor — *May 2022 - December 2022*

Contributed to OSCAR, a Julia library for complex computations in high level interdisciplinary mathematics. Documented and debugged the codebase, and collaborated in implementing support for Coxeter groups.

Epic Systems Corporation — *Verona WI, United States*

Software Developer — *August 2019 - May 2021*

Developed full stack projects for a patient portal used by millions, taking the lead on design, coding, performance measurements, and organizing stakeholder meetings. Added system settings allowing doctors who could not be seen in person to be available for telehealth visits (done in response to the pandemic). Restructured appointment scheduling data for flexibility and ease for future development. Collaborated with Denmark hospital to design a new workflow for appointment scheduling that meets their national regulations.

Spectral Sciences Incorporated — *Burlington MA, United States*

Research Intern — *June 2018 - August 2018*

Coded liquid metal propellant model for ESPET, a toolkit to model electrospray propulsion systems. Developed and coded atmospheric diffusion model for DEBRIS toolkit.

Hebrew University Computer Science Department — *Jerusalem, Israel*

Research Intern — *June 2016 - August 2016*

Participated in the Onward Israel internship program, interning with Professor Daphna Weinshall. Investigated schizophrenia detection through motion tracking. Explored data processing using the WEKA toolkit and MATLAB to write walking detection algorithms.

Publications

Quantum-Hybrid Stereo Matching With Nonlinear Regularization and Spatial Pyramids
Cameron Braunstein, Eddy Ilg, Vladislav Golyanik
2023

Projects

The Quantum Computing Survival Guide *Saarbrücken, Germany*
Creator *January 2023 - March 2023*
Created a lecture on mathematics governing gate based quantum computing. The lecture is supplemented with demonstrations with a quantum device simulator, and an exercise sheet. Delivered the lecture at the Max Planck Institute for Informatics (MPII), where it was recorded and published. https://www.youtube.com/watch?v=fE8QXn4AbIw&t=2s

GANs for Album Cover Generation *Saarbrücken, Germany*
High Level Computer Vision Course Research Member *May 2022 - August 2022*
Trained StyleGAN2 to synthesize cover art for metal genre albums. Experimented with techniques in text detection and removal in the training data, as training data text was an obstacle in the model's generation fidelity.
https://docs.google.com/presentation/d/1Dgv_3vi3BTGpMn2NGfII2gHdKalgm0t_hY3jjs-Uw4w

Neural Network Pruning *Bangalore, India*
Statistical Machine Learning Course Research Member *February 2018 - April 2018*
Researched existing Neural Network pruning techniques in a group of three. Developed, tested and documented a novel variant on the L-OBS pruning algorithm, and found improvements in accuracy over the original algorithm.
https://drive.google.com/file/d/14FF6-yNz0BgUrOpNb3BRR6HfxzC5mQeR

Augmented Reality D&D Web App *Waltham MA, United States*
Capstone Software Engineering Team Member *September 2017 - December 2017*
Designed and built a SQL database-backed web application with Ruby on Rails on a team of four, collaborating on the user interface, database scheme design, overall code architecture. Web component lets users create adventures and characters for their Dungeons and Dragons (D&D) campaigns. Mobile component of the application shows users their creations in Augmented Reality. https://github.com/AR-DnD/AR-DnD

Automated Music Transcription Senior Project *Tyngsborough MA, United States*
Creator *January 2015 - May 2015*
Researched file I/O and data processing techniques such as Fourier Transforms. Wrote a Python program capable of transcription of piano recordings. Prepared a presentation demonstrating my methods and results for a panel of teachers and peers.

Tutoring

Image Processing and Computer Vision *Saarbrücken, Germany*
Saarland University Mathematical Image Analysis Group *April 2023 - September 2023*
Grade and present solutions to assignments on image processing and computer vision.

Automated Reasoning *Saarbrücken, Germany*
Max Planck Institute for Informatics Automation of Logic Group *October 2021 - February 2022*
Graded and presented solutions to assignments on propositional and first order logic with equality.

Advanced Programming Techniques *Waltham MA, United States*
Brandeis University Computer Science Department *January 2019/2017 - May 2019/2017*
Guided students in Java coding in the Eclipse IDE. Researched and created a new coding assignment on block chain technology. Presented assignments for students at a weekly recitation. Reviewed student's programming assignments in weekly one-on-one meetings.

Capstone Software Engineering *Waltham MA, United States*
Brandeis University Computer Science Department *September 2018 - December 2018*
Coached student teams in developing their own SQL database-backed web apps in Ruby on Rails, both as a technical advisor and group facilitator. Organized and delivered a lecture on HTML and CSS.

Introduction to Rings and Fields *Waltham MA, United States*
Brandeis University Mathematics Department *September 2017 - December 2017*
Assisted students with homework questions in abstract algebra. Wrote solution guides to weekly assignments in Latex.

Programming Language Experience

Python	Numerous machine learning research projects with PyTorch.
C# and Javascript	Commercial web development, used .NET Framework.
C++	Compiler construction for the C language using LLVM.
Ruby	Ruby on Rails website capstone project.
Julia	OSCAR Computer Algebra System.
Java	Creating programming assignments with test suites.

Spoken Languages

English	Native proficiency
German	Conversationally fluent

Additional Experience

PhD Student Representative *Saarbrücken, Germany*

Research Training Group Executive Board *December 2023 - Present*

Liason between the PhD students, associated members, and principle investigator of the research training group. Duties include application reviews, leading meetings, and general administrative tasks.

False Advertising Improv Troupe *Waltham MA, United States*

Performing Member and Co-President *September 2016 - May 2019*

Regularly performed long-form improvisation with musical elements. As co-president, created and taught lessons on musical improvisation at biweekly rehearsals. Scheduled rehearsals and shows, and handled budgeting. Organized performances at the Improv Boston College Comedy Festival and Skidmore National College Comedy Festival for the troupe for the first time.

Brandeis University Chamber Singers *Waltham MA, United States*

Singer (Bass-Baritone) *September 2015 - May 2019*

Rehearsed and performed a variety of classical and modern choral works, led by conductor Dr. Robert Duff. Performed on international tours in Austria, the Czech Republic, and Italy (in St. Peter's Basilica!)

Classical Piano *Multiple Locales*

Piano Player *November 2012 - Present*

Over ten years of experience playing the piano, specializing in playing the works of Claude Debussy.