Caia Gelli

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EDUCATION

University of Pennsylvania | School of Engineering and Applied Science | August 2021 - May 2025 | Philadelphia, PA
Bachelor of Science in Engineering, Digital Media Design, GPA: 3.43
Relevant Coursework: Data Structures & Algorithms, 3D Modeling, Interactive Computer Graphics, Big Data Analytics, Web Systems, Artificial Intelligence, Machine Learning

EXPERIENCES

3D Application Developer/Realtime Software Engineering Intern — Arthrex | Naples, FL | June 2025 - August 2025
- Prototyped a virtual assistant in Unreal Engine with custom C++ TTS/ASR pipelines containerized in Docker; demoed to AR/VR team lead on Arthrex's Holodeck virtual production stage using Pixera for 3D projection
- Integrated and tested real time AI speech tools: Convai, NVIDIA ACE, Kokoro (via FastAPI), and NVIDIA Parakeet
- Prototyped 5 interactive AR ads for Arthrex Vet team using the ImagineWebAR plugin for Unity

Research Assistant for Department of Radiology — Penn Medicine | Remote | June 2024 - September 2024
- Used Monai framework on ~500 MRI images to identify features that predict the development of Alzheimer's.
- Implemented models with DenseNet architecture to improve predictive accuracy from 50% to 85%.

CS Intern — University of Ghana Noguchi Memorial Institute for Medical Research | Accra | June 2023 - July 2023
- Optimized food recognition AI (FRANI) to support nutrition programs in Global South schools
- Consolidated 100+ class labels and boosted model performance by using Fastai, WandB, and Optuna

CS Intern — A. James Clarke School of Engineering, UMD | College Park, MD | July 2020 - August 2020
- Simulated spiking neural networks in Brian2 to compare Hodgkin–Huxley vs. integrate-and-fire models.

Penn Track & Field | *Philadelphia, PA* | August 2021- May 2025
- 2024 NCAA Nationals competitor & Ivy League record holder for the 4x100

PROJECTS

Interactive Computer graphics
- Mini Minecraft using C++ and OpenGL: focused on procedural terrain, texturing and L system implementations
- Rasterizer in OpenGL & Ray/Path tracer: Monte Carlo approximation, direct lighting estimation, specular reflective & transmissive materials, multiple importance sampling, global illumination, PBRs, screen space reflections, SDFs

Functional Search Engine
- Designed full-stack search engine with distributed crawling, indexing, and ranking across 50k+ pages
- Built scalable inverted index with hash-based partitioning; ranked 5k+ terms with TF-IDF and PageRank

SPH Fluid Simulation
- Built custom SPH solver with pressure, viscosity, and surface tension; supported 3K+ particles at 30 FPS
- Applied XSPH smoothing, hybrid pressure solvers, and dynamic time stepping for stability

Deep Learning for Image Segmentation
- Implemented CNNs with transfer learning and data augmentation for semantic segmentation across 10k images

Alumni AI Connect Chrome Extension
- Developed chrome extension to facilitate alumni outreach, using optimal LLM prompting; tested by 20+ students

SKILLS, INTERESTS & LANGUAGES

Skills: Unreal Engine, Java, C/C++, Python, Blender, Maya, ZBrush, Unity, Houdini, Adobe Creative Cloud, Figma, HTML, JavaScript, OCaml, R, OpenGL, Vite/React, SQL, Agile
Languages: Italian & French at an intermediate level
Interests: 3D Modeling, Game Design, Video Art, Particle Physics, Physically-based Rendering Techniques, AR/VR