Austin Jetrin Maddison

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Implements rendering and GPU compute techniques for real-time visual effects, engine development and GPGPU applications.

EDUCATION

Mahidol University International College **Expected Graduation: Jan 2026**

B.S in Computer Science, Minor in Applied Mathematics (In major GPA 3.3)

EXPERIENCE

Mahidol University International College Apr 2023 - Apr 2025

Teaching Assistant Salaya, Nakhon Pathom

- Assisted students in mastering core programming concepts across courses including **Functional and Parallel Programming, Data Structures, Abstraction & Object-Oriented Programming, and Intro to Programming.**
- Provided **personalized guidance** in problem-solving and debugging, fostering a deeper understanding of course material.
- Graded **300+ assignments** across courses using automated scripts and manual instrumentation.
- Developed and refined **technical communication** and logical analysis skills, effectively conveying complex concepts to students.

Adapter Digital Nov 2023 - Mar 2024

Software Developer, Part Time Ari, Bangkok

Collaborated with design and innovation teams to create **3-player 3D game installation "Seemless City" for Bangkok Design Week 2024**.

- Implemented **real-time rendering features** such as **procedural meshes**, **HLSL shaders** using Unity's C# framework and high definition render pipeline.
- Highlight features: **dynamic multiple focal point vignetting** with variable feathering using signed distance fields (SDF), inertia **animation hooks**, fluttering cloth using **multi-scale perlin noise wind**, SDF **particle collisions**, **bloom/glare**.
- Extended **Intel RealSense's C# API** to allow for depth normalization and remapping to be used in calibration tool onsite.
- The reception was **overwhelmingly positive from 200+ participant surveys** and optional comments described that the full-body motion controls, multiplayer and 3D aspects were refreshing and unique.

Adapter Digital Aug 2023 - Sep 2023

Software Developer, Internship Ari, Bangkok

Developed a **real-time motion capture 3D installation** project "Hello Mascot" for the firm's product portfolio as their part of diversifying the kinds of digital products they can give to clients. The project's reception with colleagues was very positive and **surpassed expectations**.

- Collaborated with the innovation team's C# developer to implement **motion controls** using **Google's MediaPipe** library for pose landmark detection from external camera feed to interact with virtual character and world.
- Implemented **shaders for vegetation and cloud wind, stop motion clay river water wakes, stop motion clay character** and **fully gpu-driven 2D facial animations** using multi UVs and sin/cos functions for scheduling expressions.
- Modeled, textured, animated, layout and lit environment props and character assets using high-poly to low-poly pipeline.

PROJECTS

GPU-Based Monte Carlo Global Illumination & Irradiance Field Probes `C++, GLSL, COMPUTE-SHADERS, DEAR-IMGUI`

Real-time global illumination system using GPU Monte Carlo methods and irradiance probes.

- Developed a **high-performance GI system** with Monte Carlo methods for accurate light transport simulation.
- Implemented **GPU-based compute shaders** for ray marching in Signed Distance Field (SDF) environments.
- Designed an **irradiance probe system** for indirect lighting, optimizing computational efficiency.
- Benchmarked **Monte Carlo GI vs. irradiance probes**, showing **8x speedup** while retaining realism.

Faithful Plant Placement `VEX, OPENCL, C++, PYTHON, HLSL, HOUDINI-ENGINE, UE5`

Procedural vegetation simulation tools for Unreal Engine 5 based on environmental data.

- Developed **procedural simulation tools** for vegetation placement using climate, topology, and species data.
- Implemented **adaptive placement algorithms** and seeding logic using iterative optimization.
- Rendered **photorealistic snapshots** supporting simulation accuracy and art direction.

Separable Convolution Circular Lens Blur C#, MATLAB, HLSL, UNITY-URP

Efficient real-time Bokeh blur post-processing effect using separable convolution in phasor domain.

- Implemented a post-processing Bokeh blur algorithm with **O(n) runtime** instead of O(n^2) using separable convolution in imaginary phasor space.
- Prototyped algorithm in MATLAB then ported to **Unity HDRP** using ShaderLab HLSL, enabling real-time cinematic lens effects.

Mini Sky Engine OPENGL, C#, GLSL, OPENTK, DEAR-IMGUI

Atmospheric rendering engine simulating sky scattering and volumetric clouds in real-time.

- Simulated **atmospheric effects** with sunlight, sky scattering, and volumetric clouds using GPU LUTs.
- Built raymarcher render engine with **FBM noise** and procedural density shaping for clouds.
- Built **engine architecture** in C# with shader management and IMGUI for debug GUI.

Passive Matrix LCD Shader GLSL, GODOT, C#

Procedural shader simulating optical effects of monochrome passive matrix LCD displays.

- Simulated **optical effects** like parallax shadows, shimmer, and backlight bleed.
- **Engineered** a **procedural pixel matrix** using **GLSL** for authentic LCD rendering with arbitrary buffer inputs.
- Optimized shader performance for **real-time applications**.

Interactive Pathfinding Algorithm Visualizer C#, HLSL, UNITY-URP

Real-time pathfinding algorithm visualizer with modular search support and interactive UI.

- Built a real-time algorithm visualizer supporting **multiple search algorithms** (A*, BFS, Drikjsta, Greedy) with modular architecture.
- Developed an **event-driven UI system** with dynamic updates and heuristic cost overlays.
- Integrated **real-time performance metrics** and intuitive grid editor for scenario customization.

Hello Mascot UNITY, C#, GOOGLE-MEDIAPIPE

Interactive mascot demo enabling full-body pose tracking and stylized GPU shaders.

- Enabled **full-body interactions** using Google MediaPipe pose tracking.
- Designed **GPU shaders** for stylized visuals and procedural sprite based facial animation via UV sets and blending.
- Modeled and animated high-fidelity characters for **live installations**.
- Delivered a successful **proof-of-concept** for internal company's product portfolio.

SKILLS

Programming Languages

C#/.NET Java Python JavaScript C/C++ TypeScript Go Scala Lua VEX GLSL

Web Development

HTML/CSS React Hugo Tailwind Spring-Boot Jinja2 Flask Vue NextJS Bootstrap Vite REST WebAssembly Electron ThreeJS Firebase Redis SQL MySQL PostgreSQL

Data Science

Jupyter-Notebook NumPy SciPy Pandas Seaborn MatPlotLib MATLAB TensorFlow Apache-Spark

Graphics & 3D

OpenGL Godot Unity UE5 Houdini Maya Blender Cinema-4D Redshift Adobe-Suite ComfyUI DearImGUI CUDA OpenCL FFMPEG OpenCV

DevOps & Tools

Git Unix CMAKE JUnit GitHub-Actions Kafka Apache-Airflow Kibana-ElasticSearch Docker

AWARDS

Outstanding Cambridge Learners Awards - Thailand: Highest Achievement Award for Digital Media and Design 2020
Cambridge Assessment International Education

LANGUAGES

English: *Native speaker*, **Thai**: *Conversational*