ELIE DIAZ

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EDUCATION

University of Utah

- **PhD in Computing, Graphics and Visualization Track** *expected May 2026*

Georgia Institute of Technology

- **Master of Science in Computer Science, focused on Computer Graphics** *May 2021*

GPA: 3.83/4.0

- **Bachelor of Science in Computer Science with Highest Honors** *May 2019*

GPA: 3.87/4.0

PUBLICATIONS

- Gaurav Bhokare, Eisen Montalvo, Elie Diaz, & Cem Yuksel (2024). **Real-Time Hair Rendering with Hair Meshes.** In SIGGRAPH 2024 Conference Papers (pp. 61:1–61:10). ACM Press.
- He Chen, Elie Diaz, & Cem Yuksel (2023). **Shortest Path to Boundary for Self-Intersecting Meshes.** ACM Transactions on Graphics (Proceedings of SIGGRAPH 2023), 42(4).
- Gaurav Bhokare, Eisen Montalvo, Elie Diaz, Mitchell Allen, & Cem Yuksel (2023). **Super Fast Strand-based Hair Rendering With Hair Meshes.** In SIGGRAPH '23 Real-Time Live!. ACM.

RESEARCH AND PROJECT EXPERIENCE

University of Utah Computer Graphics Lab Group – Graduate Research advisor: Dr. Cem Yuksel *Fall 2021 – Present*

- Author on publications and submissions to SIGGRAPH and other Computer Graphics Conferences
- Started and participated in various projects for Dr. Yuksel's Lab Group with the goal of publishing in esteemed conferences
- Projects have included work on various Simulation Frameworks (VBD, MPM, XPBD), Collision Handling, and Rendering

Locomotion of Underwater Creatures – Final Project for Simulation of Biology (CS 7492), Dr. Greg Turk *Spring 2021*

- Created a model of mass-spring systems to represent creatures that could swim in water
- Advancement of the project combined work to allow the creatures to direct their movements towards specific targets

Simulating Phase Transitions – Graduate Research advisor: Dr. Greg Turk *Spring 2020*

- Simulated liquid, plastic, and elastic materials using the Material Point Method, an algorithm that combines grid-based and particle-based methods to produce realistic-looking behavior in the relevant materials
- Incorporated algorithms from current material research into the snow simulator to implement the effects of freezing and melting to identify the effects of different variables in the behavior of snow as it changes phase
- Refactored the snow simulator code to work for 3D as well as 2D materials

Numerical Methods for Fluid Simulation – Graduate Research advisor: Dr. Greg Turk *Fall 2019*

- Created and expanded on fluid simulation solvers to simulate materials such as smoke, water, and snow in 2D
- Used a grid-based system to demonstrate different forms of numerical integration for solving Navier-Stokes equations
- Simulated liquid, plastic, and elastic materials with the Material Point Method, further building on existing research to compare differences between the different forms of fluid simulation

Hand Image Synthesis – Undergraduate Research advisor: Dr. Karen Liu *Fall 2018 – Spring 2019*

- Animated a rigged hand model in Maya to capture imagery and collect hand pose data to test machine learning models
- Trained a neural network to create artificial images of human hands in poses chosen by the user

"3DJ" Virtual Reality DJ Station – Final Project for 3D-User Interfaces (CS 8803), Dr. Blair MacIntyre *Spring 2020*

- Designed and implemented a virtual reality DJ station for a basic sound control interface
- Used different user interface techniques to design responses to a user's manipulation of virtual disks to adjust playback speed and test the effects on the user experience

"Swipes Clock" Application – Final Project for Computer Aesthetics (CS 6497), Dr. Jarek Rossignac *Fall 2019*

- Created an interface to visually and audibly compare different styles of tuning for four-part music

- Used linear and logarithmic interpolations between pitches of notes to observe the aesthetic effects of *glissando*, or continuous slides between notes

"Formant Grader" – Final Research Project for Computer Audio (CS 4590), Dr. Marybeth Gandy *Fall 2018*

- Collected data from singers and empirically rated duets of singers on the closeness of *formant*, comparing the tones and vowels of two singers singing the same passage of music
- Trained machine learning algorithms with the data and ratings to observe the accuracy of creating an application to automate the rating system

"Vaccination Strategy" – Final Project for Data-Science for Epidemiology (CSE 8803), Prof. B. Aditya Prakash *Fall 2020*

- Developed an algorithm for a vaccination strategy given a limited budget, level of risk, and temporary immunity from the vaccination
- Greedy algorithm outperformed several baselines, including random vaccination and highest-degree vaccination

"Interpolating Between Musical Chords" – Graduate Research Advisor, Dr. Jarek Rossignac *Fall 2020*

- Created an application to interpolate the frequencies between notes over time, allowing the user to design the path of the change by setting values of control points
- By using visual aids as references, this application is a method for analyzing the effects of changing frequencies of triads on the listener's perception of notes from one chord to another while passing through a custom intermediate path

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TEACHING EXPERIENCE

University of Utah Interactive Computer Graphics (CS 4600) Teaching Assistantship – Salt Lake City, UT *Fall 2024*

- Co-Instructor for the course with Professor Cem Yuksel.
- Led Q/A sessions with students on topics involving computer graphics techniques, including rendering, raytracing, curve interpolation, animation, and geometry processing

University of Utah Interactive Computer Graphics (CS 6610) Teaching Mentorship – Salt Lake City, UT *Spring 2023*

- Co-Instructor for the course with Professor Cem Yuksel.
- Led Q/A sessions with students on topics involving techniques in real-time rendering using the GPU pipeline

University of Utah Computer Graphics (CS 4600) Teaching Mentorship – Salt Lake City, UT *Fall 2022*

- Assisted with course logistics and instruction under Professor Cem Yuksel
- Led groups of up to 25 students through projects using a variety of teaching techniques during weekly office hours held in person
- Provided instruction on topics such as GPU programming, rendering, raytracing, curve interpolation, animation, and geometry processing

Georgia Tech Computer Graphics (CS 3451) Graduate Teaching Assistant – Atlanta, GA *August 2019 – May 2021*

- Graduate teaching assistant for Professors Blair MacIntyre and Greg Turk
- Created resources such as personalized notes and class materials for 600+ students
- Lectured for classes of up to 150 students per the request of the professor
- Led groups of up to 25 students through projects using a variety of teaching techniques during weekly office hours held both in person and online, through virtual video calls held on Georgia Tech systems
- Provided instruction on topics such as GPU programming, rendering, raytracing, curve interpolation, animation, and geometry processing

Georgia Tech Computer Graphics (CS 3451) Undergraduate Teaching Assistant – Atlanta, GA *January 2018 – May 2019*

- Undergraduate teaching assistant for Professors Greg Turk and Jarek Rossignac
- Provided detailed feedback on student projects, including information on areas of improvement, expansion, organization and break-down of projects
- Collaborated with the professors and other teaching assistants to improve course logistics and give more effective instruction in course materials

Student Director of the Georgia Tech Chamber Choir – Atlanta, GA *August 2016 – May 2021*

- Directed subgroups of the Chamber Choir under Professors Jerry Ulrich and Timothy Hsu
- Led music instruction for groups ranging from small octets to the full choir
- Performed and directed varied repertoire that included composers such as J.S. Bach, G.F. Handel, and Aaron Copland, as well as student-created arrangements

Orlando Science Center Summer Camp Counselor – Orlando, FL *Summers 2016 – 2017*

- Led groups of up to 25 students (K-9) in educational summer camp experiences based in the Science Center
- Guided hands-on activities in on-site exhibits and labs in collaboration with museum staff
- Covered topics such as basic programming, engineering, and critical thinking, as well as general knowledge of various fields of science

INDUSTRY EXPERIENCE

Roblox Internship Program – San Mateo, CA *Summer 2023*

- Supervised by Cem Yuksel, Victor Zordan, and Morgan McGuire
- Work on prototypes to solve rendering problems in the current versions of Roblox

Workiva Internship Program – Columbus, GA *Summer 2018*

- Supervised by John Pillar, Senior Software Engineer at Workiva
- Maintained an application for a collaborative online workspace directed at improving the workflow of accountants
- Contributed to the Agile workflow and project management procedure to solve software engineering problems
- Planned and outlined intern projects and prepared documentation for senior engineers to continue support on new features

SKILLS

Computational Skills and Relevant Coursework

- Physics-Based Simulation, Computer Graphics, Ray Tracing, Machine Learning Algorithms (Including Supervised, Unsupervised, and Reinforcement Learning), Computer Animation

Languages Spoken

- Spanish (Native fluent in Spoken and Written)
- English (Native fluent in Spoken and Written)

TOOLS AND PROGRAMS USED

Programming Languages

- Extensive experience with C++, Python, Java, C, TypeScript
- Working knowledge of MatLab, GLSL, JavaScript, and C#

Programs and Libraries

- TBB, Blender, OpenGL, WebGL, Processing, Eigen

HONORS AND AWARDS

Shane & Robin Robison Fellowship Fall *2021*

- Awarded to outstanding students in computer science to provide support in the beginning of a PhD program

Gates Millennium Scholar Fellowship *Spring 2015 – Present*

- Awarded as part of a competitive scholarship granted by the Bill & Melinda Gates Foundation providing funding for undergraduate and graduate degree programs

Outstanding Undergraduate Teaching Assistant *Awarded Spring 2020*

- Awarded as part of the 29th Annual Georgia Tech College of Computing Awards
- Nominated by two professors for outstanding performance as a teaching assistant in Computer Graphics (CS 3451)

LEADERSHIP AND COMMUNITY INVOLVEMENT

Barbershop Harmony Society *2012 – Present*

Music Team Member

- Assisted in the rehearsals and musical leadership in multiple choruses (*The Atlanta Vocal Project*, *Saltaires Chorus*)

General Member

- Competed at both the District and International levels with quartets and choruses dedicated to four-part harmony
- Trained for arranging and performing acapella music at a high level with special focus on creating expanded sound
- District Champion and Multi-time International Quarterfinalist with *Mischief Quartet*

Georgia Tech Chamber Choir *2015 – May 2021*

Internal Vice President

- Served as officer in charge of internal logistics, which included communication with and organization of 50+ choral students and the management and supervision of 8 section leaders and other officers
- Managed rehearsals and logistics for 24 students and 3 faculty members for the choir's first international trip to Cyprus, directing over 22 performances in collaboration with the United States Embassy as well as the University of Nicosia and the Cyprus University of Technology

Accompanist

- Provided piano accompaniment for several performances of small ensembles in the choir

Pi Epsilon Phi Service Fraternity *2019 – May 2021*

Member

- Participated in choral service fraternity dedicated to service around on-campus events
- Assisted in the setup and tear down of performance venues for the Georgia Tech Choirs
- Led rehearsals and assisted with food preparation for off-campus and on-campus retreats