# Ryan **Zesch**

*313 Lincoln Ave, Apt #63, College Station TX, 77840*

(614)-285-8135 | ryan.zesch@gmail.com | ryanzesch | ryanzesch


## Education

### Ph.D. in Computer Science
*College Station, TX*

Texas A&M University — *Aug. 2021 - Present*

- Research focus of computer graphics and machine learning

### B.S. in Computer Science, B.S. in Mathematics
*San Luis Obispo, CA*

California Polytechnic State University — *Sept. 2016 - March 2021*

- 3.94 Cal Poly GPA

## Awards

- Invited Speaker, International Symposium on Intelligence Design, 2024
- Best Paper Award, Southwest Data Science Conference, 2023
- Texas A&M University College of Engineering Merit Fellowship
- Robert P. Balles Mathematics Scholarship, Cal Poly, 2019
- Dean's List, Cal Poly, each quarter
- President's List, Cal Poly, each year

## Publications

- Ryan S. Zesch, I-Chao Shen, Haoran Xie, Bo Zhu, Shinjiro Sueda, Takeo Igarashi (2025, May 26). Interactive Multilayer Gaussian Garments for Low-Cost Try-On. Graphics Interface 2025. (Conditionally Accepted).
- Ryan S. Zesch*, Chunkai Fu*, Brandon G. Nguyen*, Jung Hoon Seo*, Samson Zhou (2025, Apr. 24). Learning-Augmented Search Data Structures. ICLR 2025.
- Zesch, R., Modi, V., Sueda, S. & Levin, D. (2023, Nov. 25). Neural Collision Fields for Triangle Primitives. ACM SIGGRAPH Asia 2023 Conference Proceedings.
- Zesch, R., Witemeyer, B., Xiong, Z., Levin, D. & Sueda, S. (2023, March 24). NBD-Tree: Neural Bounded Deformation Tree for Collision Culling of Deformable Objects. Southwest Data Science Conference 2023.
  - Won Best Paper Award
- Zesch, R., Witemeyer, B., Xiong, Z., Levin, D. & Sueda, S. (2022, Feb. 4). Neural Collision Detection for Deformable Objects. arXiv:2202.02309.
- Zesch, R. & Migler, T. (2021, March 3). Packing edge-disjoint T2 trees in constrained birpartite graphs [Conference session]. 2021 Computer Science Conference for CSU Undergraduates, Virtual. http://hdl.handle.net/20.500.12680/736669322

## Research

### Applied Scientist Intern
*Sunnyvale, CA*

Amazon — *June 2024 - Aug. 2024*

- Performed research on virtual try-on methods utilizing diffusion models

### NSF IRES Researcher
*Tokyo, Japan*

University of Tokyo — *June 2023 - Aug. 2023*

- Researched virtual garment try-on methods based on neural networks as part of the NSF IRES: Physical AI Design program
- Supervised by Takeo Igarashi, Haoran Xie, and Bo Zhu

### Summer Research Intern
*College Station, TX*

NVIDIA - Simulation Technology — *May 2022 - Sept. 2022*

- Conducted research on neurally integrated collision detection, with the goal of creating a single method to handle various types of primitive collisions
- Supervised by David I.W. Levin

### Graduate Research Assistant
*College Station, TX*

Texas A&M University — *Aug. 2021 - Present*

- Conducted research on collision detection accelerated by deep learning techniques
- Explored techniques include signed distance functions, neural bounding trees, and neural primitive integration

### Senior Project - Spanning Tree Graph Packing
*San Luis Obispo, CA*

California Polytechnic State University — *Jan. 2020 - May 2021*

- Researched how many disjoint spanning trees of a certain class can be packed into almost balanced bipartite graphs
- Published in the 2021 Computer Science Conference for CSU Undergraduates

### Frost Research Fellow - Pell Conics, Elliptic Curves and Cryptography
*San Luis Obispo, CA*

California Polytechnic State University — *Jun. 2018 - Sept. 2018*

- Studied the group structure of Pell conics and elliptic curves with respect to cryptographic applications
- Created demonstrations of Pell conic key exchange, Pollard's P-1 integer factorization, and Lenstra's elliptic curve factorization algorithms in C
- Presented at an MAA Golden Section undergraduate research poster session

### Frost Research Fellow - Kneading Sequences
*San Luis Obispo, CA*

California Polytechnic State University
*June 2017 - June. 2018*

- Researched skew tent map kneading sequences, involving dynamical systems, and topological entropy, visualized using Python

## Professional Experience

### Graduate Teaching Assistant - Computer Animation, CSCE 450
*College Station, TX*

Texas A&M University
*Jan. 2025 - May 2025*

- Served as a teaching assistant for an undergraduate computer animation course, including grading and holding office hours
- Guest lectured on spline curves; Barycentric coordinates

### Graduate Teaching Assistant - Computer Graphics, CSCE 441
*College Station, TX*

Texas A&M University
*Jan. 2024 - May 2024*

- Served as a teaching assistant for an undergraduate computer graphics course
- Guest lectured on texture mapping

### Graduate Teaching Assistant - Computer Animation, CSCE 450
*College Station, TX*

Texas A&M University
*Sept. 2022 - Dec. 2022*

- Served as a teaching assistant for an undergraduate computer animation course, including grading and holding office hours

### Instructional Student Assistant
*San Luis Obispo, CA*

California Polytechnic State University
*Sept. 2018 - May 2021*

- Created worksheets and facilitated peer learning for two proof based Mathematics courses as a Workshop Leader
- Enabled students participating in workshops to pass classes at higher rates than students not in attendance

### Software Development Intern
*Redondo Beach, CA*

Northrop Grumman Space Systems
*Jun. 2020 - Sept. 2020*

- Implemented test set software for evaluating performance of various RF devices in C#, designed to be easily portable for future projects
- Designed and developed Excel report generation software, generalizing existing functionality to be configurable for multiple RF test sets

### Software Development Intern
*Columbus, OH*

Blubrry Podcasting (blubrry.com)
*Jun. 2019 - Sept. 2019*

- Developed classes and scripts for database and site maintenance in PHP, using AWS tools including S3 and Route 53
- Updated and improved frontend and backend of all directory pages for a site redesign, using Bootstrap framework

## Other Projects

### XPBD Neo-Hookean Constraint
*College Station, TX*

CSCE 649 - Physically Based Modeling
*Sept. 2022 - Dec. 2022*

- Implemented extended position-based dynamics in C++, with Eigen and OpenMP parallelization.
- Implemented a Neo-Hookean material model for deformable objects in XPBD.

### Neural SDF Ray Tracer
*College Station, TX*

CSCE 645 - Geometric Modeling
*Sept. 2021 - Dec. 2021*

- Wrote a ray tracer in python for the purpose of rendering implicit neural representations of deformable models.
- Deformable models were learned as a signed distance function in pytorch, using linear modes of deformation as input coding.

### Ray Tracer
*San Luis Obispo, CA*

CSC 473 - Advanced Rendering Techniques
*Sept. 2020 - Dec. 2020*

- Wrote a CPU based ray tracer in C++, featuring multiple primitives, obj meshes, and refractive and reflective materials
- Integrated ray marching for fractal generation, textures, POV-Ray file loading, and parallelization through OpenMP

### Lightspeed Breakout
*San Luis Obispo, CA*

CSC 476 - Real-Time 3D Computer Graphics Software
*Mar. 2020 - June 2020*

- Created a game working in a team of four, using C++, OpenGL, and an entity component system
- Wrote an octree spatial data structure, led game physics design, and implemented cartoon shaders in GLSL

## Technical Skills

- **Programming** | C++, Python, C#, C, Java, MATLAB, git, UNIX
- **Machine Learning** | Pytorch, Pytorch Lightning, TF, Keras
- **Computer Graphics** | OpenGL, GLSL, GLM, OpenCV, Eigen, OpenMP, CUDA, NVIDIA Warp

## Service

- **Reviewer** | SIGGRAPH 2025 | Computer Animation and Virtual Worlds 2024,2025