

Ryan Zesch

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Education

B.S. in Computer Science, B.S. in Mathematics

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

- 3.94 Cal Poly GPA - Dean's List 12 of 12 quarters - President's List 4 of 4 years

San Luis Obispo, CA

Sept. 2016 - March 2021

Research

Senior Project - Spanning Tree Graph Packing

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

- Researched how many disjoint spanning trees of a certain class can be packed into almost balanced bipartite graphs
- Working to develop provably correct algorithms for finding these types of spanning trees in graphs
- Aiming to publish results once further research has been completed

San Luis Obispo, CA

Jan. 2020 - Present

Frost Research Fellow - Pell Conics, Elliptic Curves and Cryptography

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

- 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

San Luis Obispo, CA

Jun. 2018 - Sept. 2018

Frost Research Fellow - Kneading Sequences

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

- Researched skew tent map kneading sequences, involving dynamical systems, and topological entropy, visualized using Python
- Presented progress to advisors and graduate students in biweekly meetings

San Luis Obispo, CA

June 2017 - June. 2018

Selected Projects

Ray Tracer

CSC 473 - ADVANCED RENDERING TECHNIQUES

- 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

San Luis Obispo, CA

Sept. 2020 - Present

Lightspeed Breakout

CSC 476 - REAL-TIME 3D COMPUTER GRAPHICS SOFTWARE

- 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

San Luis Obispo, CA

Mar. 2020 - June 2020

Work Experience

Instructional Student Assistant

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

- 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
- Led students in group discussion and learning exercises twice a week as a Physics Study Session Leader

San Luis Obispo, CA

Sept. 2018 - Present

Software Development Intern

NORTHROP GRUMMAN SPACE SYSTEMS

- 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

Redondo Beach, CA

Jun. 2020 - Sept. 2020

Software Development Intern

BLUBRRY PODCASTING (BLUBRRY.COM)

- 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

Columbus, OH

Jun. 2019 - Sept. 2019

Technical Skills

- **Programming** | C++, C#, C, Python, Java, SQL, Git, Unix, Kotlin, ARM Assembly, Racket, MATLAB
- **Computer Graphics** | OpenGL, GLSL, GLM, OpenCV
- **Web Development** | AWS S3, PHP, JavaScript, HTML, CSS, Bootstrap
- **Other** | LaTeX, Adobe Photoshop, Microsoft Office

Extracurricular Activity

- **Association for Women in Mathematics** | Participant in biweekly meetings advocating for diversity in mathematics
- **Simple Group** | Weekly discussion focusing on open math problems, for those with graduate school aspirations
- **Boy Scouts** | Earned the Eagle Scout rank, held various leadership positions