

Joshuah Wolper, PhD

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PROFESSIONAL SUMMARY

Research scientist with over six years' experience leading large academic teams and developing state-of-the-art, physically-based animation approaches. Key strengths include offline & real-time physics simulation, implementing new & existing computer graphics research in C++ & Python, Houdini visualization, Unreal Engine 5 experience, and project management. Excellent at learning new skills quickly and bridging the gap between technical and creative teammates.

WORK EXPERIENCE

- Postdoctoral Researcher**, University of Pennsylvania, Institute for Computational Science 2021-2023
- Templated and parallelized (tbb) fracture simulation code in C++ and Python for medical research
 - Developed new algorithms for meshless frictional contact and solid-fluid coupling
 - Designed benchmarking process for evaluating discontinuous meshless fracture methods
 - Presented findings weekly to mechanics and biology teammates
- Graduate Researcher**, University of Pennsylvania, SIG Computer Graphics Lab 2017-2021
- Led and presented two primary-authored SIGGRAPH papers: [CD-MPM](#) and [AnisoMPM](#)
 - Published two open-source fracture simulation codebases in C++ and Python: [Ziran2019](#) and [Ziran2020](#)
 - Collaborated with cryo-scientists to develop accurate tsunamigenic glacier calving simulations: [Nature](#)
 - Provided technical writing and editing for over ten high-profile publications
 - Maintained large simulation codebase in C++ with Git version control
 - Visualized large particle data sets with Houdini and generated collision assets with OpenVDB level sets

RELEVANT PROJECTS

- Unreal Engine 5 Gameplay Prototyping**, Self-Taught 2022-Present
- Designed procedural authoring tools in Blueprint for fast content creation with artistic control: [Web Content](#)
 - Gameplay programming involving Procedural Content Generation, Niagara, Chaos, Splines, Procedural Meshes
- Maya Projective Dynamics Plug-In**, University of Pennsylvania CIS660, SEAS Spring 2018
- Wrote C++ implementation of Projective Dynamics for real-time simulation of coplanar & 3D elasticity: [Code](#)
 - Integrated the solver into a Maya plug-in for authoring elastic deformations directly in the Maya timeline: [Video](#)
- Unity Position Based Dynamics**, Swarthmore College, Engineering Senior Thesis Spring 2017
- Implemented Position Based Dynamics in Unity for a real-time interactive elasticity sandbox: [Video](#)
 - Implemented multiple constraint types, interaction modes, and 3D geometries
- Funded Game Design Project**, Swarthmore College, Halpern Engineering Design Fund Summer 2015
- Self-taught Unity and built a prototype of a 2D puzzle-platformer, inspired by LIMBO: [Video](#)
 - Wrote gameplay algorithms in C# for character control, swinging ropes, climbing ladders, and solving puzzles

TECHNICAL SKILLS

Operating Systems: Ubuntu, Linux, Windows, MacOS
Programming Languages: Best = {C++, Python}, Intermediate = {C, C#, Taichi}
Game Engines: Unreal Engine 5 and Blueprint, Unity
Programs & Packages: Houdini and VEX, Blender, tbb, CUDA, LaTeX, Git, Photoshop, Keynote, Mathematica

EDUCATION

The University of Pennsylvania Philadelphia, PA
PhD in Computer and Information Science, GPA: 3.87/4.0 Aug. 2017 – May. 2021
Dissertation: Material Point Methods for Simulating Material Fracture Advisor: Chenfanfu Jiang

Swarthmore College Swarthmore, PA
B.S. in Engineering, GPA: 3.88/4.0 Aug. 2013 – May 2017
B.A. in Computer Science, GPA: 3.90/4.0 Aug. 2013 – May 2017

PUBLICATIONS: [\[Google Scholar\]](#)