

# Joshuah Wolper

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## PERSONAL STATEMENT

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I've always been energized by the intersection of art and science. In my PhD, this manifested as a love for developing computational algorithms to simulate material fracture for animation practitioners and engineers alike. More recently, I picked up UE5 and rekindled a passion for designing and implementing gameplay systems. Now, I'm excited to bring the breadth of skills I gained in CG research to your team! I'm a quick learner, and a strong generalist, well-versed in playing many roles in tough projects and communicating with interdisciplinary teammates.

## EDUCATION

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### The University of Pennsylvania

*PhD in Computer and Information Science, GPA: 3.87/4.0*

Dissertation: Material Point Methods for Simulating Material Fracture

Philadelphia, PA

*Aug. 2017 – May. 2021*

Advisor: Chenfanfu Jiang

### Swarthmore College

*B.S. in Engineering, GPA: 3.88/4.0*

*B.A. in Computer Science, GPA: 3.90/4.0*

Swarthmore, PA

*Aug. 2013 – May 2017*

*Aug. 2013 – May 2017*

## WORK EXPERIENCE

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### Postdoctoral Researcher, University of Pennsylvania, SEAS

2021-2023

- Wrote **templated** and **parallelized** fracture simulation code in **C++** and **Python** for medical research (git private)
- Worked with mechanics and biology experts to translate **real-world physics** into **computational algorithms**
- Implemented **cutting-edge algorithms** from published research
- Collaboratively managed **C++** codebase with **Git** version control
- Noted by my PIs for my **science communication** skills; routinely discussed and presented challenging topics

### Research Assistant, University of Pennsylvania SIG Lab, SEAS

2017-2021

- Published two open-source fracture simulation codebases in **C++** and **Python**: **Ziran2019** and **Ziran2020**
- Presented **cutting-edge computer graphics research** at two consecutive **SIGGRAPHs**: **AnisoMPM Recording**
- Managed multiple high-impact projects requiring efficient communication with interdisciplinary team members
- Synthesized and **augmented peer-reviewed computational approaches** to develop new ones
- Collaboratively maintained a large, complex simulation codebase in **C++** with **Git** version control
- Visualized **large particle data sets** with **Houdini** and generated collision assets with **VDB** level sets

## RELEVANT PROJECTS

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### Unreal Engine 5 Project, Self-Taught Project

2022-Present

- Designed **authoring tools** in **UE5 Blueprint** for fast content creation with **artistic control**: **Web Content**
- Wrote gameplay mechanics involving **Splines**, **Procedural Meshes**, and **Instanced Static Meshes**

### Maya Authoring Tool for Physics Animation, 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 Soft-Body Physics Sandbox, 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

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

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## TECHNICAL SKILLS

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**Operating Systems:** Ubuntu, Linux, Windows, MacOS

**Best Programming Languages:** C++ and Python

**Programs & Packages:** UE5 and Blueprint, Unity, Houdini, tbb, CUDA, LaTeX, Git, GIMP/Photoshop, Keynote