# Adam Finkelstein

<https://www.cs.princeton.edu/~af/>

<https://gfx.cs.princeton.edu>

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| Title: | Automatic Cinematography using Pans and Cuts in 360-Degree Video |
| Authors: | [Hamburger, Mitchell](https://dataspace.princeton.edu/jspui/browse?type=author&value=Hamburger%2C+Mitchell) |
| Advisors: | [Finkelstein, Adam](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Finkelstein%2C+Adam) |
| Department: | Computer Science |
| Class Year: | 2018 |
| Abstract: | Recent strides in virtual-reality technology have allowed for the development of 360-degree videos, or videos in which the user has the freedom to look anywhere in the spherical space around the camera's point of view throughout the course of the video. With this project, we seek to develop an algorithm that would remove the human element of viewing 360-degree videos; that is, an algorithm that automates panning through the 360-degree video such that the viewer receives as output a normal-field-of-view video which still features the most interesting content of the video and respects basic cinematographic rules. We begin with an intentionally simple algorithm, and add complexity until we arrive at an algorithm that we feel is satisfactorily flexible and effective. At each step of our implementation process, we evaluate the algorithm by its quantitative performance via heat coverage in the input heatmap video, as well as by its qualitative ability to preserve basic cinematography rules and produce an output that is aesthetically pleasing. Our final version of the algorithm utilizes an attenuation map to provide diminishing returns on static fields-of-view, such that the algorithm encourages dynamic, human-like motion through the video. Our final algorithm has applications both in the academic space of computer vision, as well as in the commercial space of virtual reality and film-making tools. |
| Title: | Exploring Design Spaces for Tetris |
| Authors: | [Wallace, Drew](https://dataspace.princeton.edu/jspui/browse?type=author&value=Wallace%2C+Drew) |
| Advisors: | [Finkelstein, Adam](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Finkelstein%2C+Adam) |
| Department: | Computer Science |
| Class Year: | 2017 |
| Abstract: | We present a method for the automated generation of playability data in single-player, interactive, deterministic puzzle games, games in which a player must use strategy to decide between multiple moves and use dexterity to correctly execute those moves. We then demonstrate the effectiveness of this method for various applications by performing various analyses of the classic game Tetris. From this analysis we present various new results, including 2D visualizations of the expressive range of Tetris puzzle difficulty, and comparisons of puzzle difficulty under different scoring systems, and more. |
| Title: | Painting With Triangles |
| Authors: | [Benjamin, Mark](https://dataspace.princeton.edu/jspui/browse?type=author&value=Benjamin%2C+Mark) |
| Advisors: | [Finkelstein, Adam](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Finkelstein%2C+Adam) |
| Contributors: | DiVerdi, Steve |
| Department: | Computer Science |
| Class Year: | 2014 |
| Abstract: | Although vector graphics offer a number of benefits, conventional vector painting programs offer only limited support for the traditional painting metaphor. We propose a new algorithm that translates a user’s mouse motion into a triangle mesh representation. This triangle mesh can then be composited onto a canvas containing an existing mesh representation of earlier strokes. This representation allows the algorithm to render solid colors and linear gradients. It also enables painting at any resolution. This paradigm allows artists to create complex, multi-scale drawings with gradients and sharp features while avoiding pixel sampling artifacts |

# Szymon Rusinkiewicz

# https://www.cs.princeton.edu/~smr/

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| Title: | Mars VR: Reconstructing Interactive 3D Mars Environments for Astronaut Training |
| Authors: | [Hayes, Eric](https://dataspace.princeton.edu/jspui/browse?type=author&value=Hayes%2C+Eric) |
| Advisors: | [Rusinkiewicz, Szymon](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Rusinkiewicz%2C+Szymon) |
| Department: | Computer Science |
| Class Year: | 2019 |
| Abstract: | Human exploration missions to the Moon and Mars are slated for the near future. To prepare, astronauts and mission operations personnel need detailed knowledge of planetary geology to identify areas of interest and to evaluate terrain for rover navigation and extravehicular activity. Currently, Mars rover navigation and terrain surveying is primarily done using satellite data and imagery taken on the Martian surface, however; obtaining data from Mars is expensive, requires a lot of power and bandwidth, and comes with a big opportunity cost. In this project, we investigate ways to extend existing 2D image data to reconstruct 3D Mars environments in which users can perform tasks in an immersive and informative way in Virtual Reality. Using imagery from NASA-JPL's Curiosity rover, we build on existing photogrammetry techniques and use deep learning image colourization to reconstruct high fidelity 3D models that can be used in a real-time graphics engine. Compared to conventional 2D imagery, stereoscopic 3D displays have been demonstrated to be more accurate and efficient for depth-related applications, like judging distances, manipulating objects in space, and remote guidance. With input from the European Space Agency and NASA, we develop a tool set for astronaut training and mission planning applications. Our results demonstrate that our approach could provide the basis for a reconstruction pipeline that is widely applicable to Mars, the Moon and beyond. |
| Title: | Play With It: Interactive Digital Art |
| Authors: | [Chen, Annie](https://dataspace.princeton.edu/jspui/browse?type=author&value=Chen%2C+Annie) |
| Advisors: | [Rusinkiewicz, Szymon](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Rusinkiewicz%2C+Szymon) |
| Department: | Computer Science |
| Class Year: | 2018 |
| Abstract: | This paper reviews the current characterizations of the digital medium within the context of interactive installations and also compares the medium with traditional art forms. After establishing a vocabulary for discussing digital artworks, the paper reviews the contributions of three groups of artists and analyzes their approach to creating with the digital medium. Taking inspiration from these artists, a small prototype for an interactive application is designed and evaluated on its ability to engage the features of digital art discussed prior. |
| URI: | <http://arks.princeton.edu/ark:/88435/dsp01z029p745f> |
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| Title: | Design Stitch: A Freehand Drawing Computerized Embroidery Application |
| Authors: | [Zhao, Shelley](https://dataspace.princeton.edu/jspui/browse?type=author&value=Zhao%2C+Shelley) |
| Advisors: | [Rusinkiewicz, Szymon](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Rusinkiewicz%2C+Szymon) |
| Department: | Computer Science |
| Class Year: | 2018 |
| Abstract: | Computerized embroidery is the art of turning images and patterns into embroidery files that are stitched by embroidery machines onto clothing in a process called digitization. However, digitization is a complicated process that is presently designed mostly for enterprise use. In this work, we introduce DesignStitch, a freehand drawing digitization iOS app that is designed for beginners to learn how to digitize and create their own fashion designs. We present the overall structure of DesignStitch, and evaluate its ease of adoption with test users who have no embroidery experience. We then present further work to improve the user experience of the app. |
| URI: | <http://arks.princeton.edu/ark:/88435/dsp01dv13zw953> |
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| Title: | Scheling Lines on 3D Surface Meshes |
| Authors: | [E, Jane](https://dataspace.princeton.edu/jspui/browse?type=author&value=E%2C+Jane) |
| Advisors: | [Rusinkiewicz, Szymon](https://dataspace.princeton.edu/jspui/browse?type=advisor&value=Rusinkiewicz%2C+Szymon) |
| Department: | Computer Science |
| Class Year: | 2012 |
| Extent: | 58 Pages |
| Other Identifiers: | 27336 |
| URI: | <http://arks.princeton.edu/ark:/88435/dsp014x51hj44s> |