# Edoardo Alberto Dominici

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## Work Experience

**Rendering Engineer** **Toronto, Canada** **January 2021 – August 2021**

- *Tangent Animation*, extending the in-house production renderer and supporting the pipeline.

**Research Assistant** **Vancouver, Canada** **September 2017 – May 2020**

- *University of British Columbia*, Digital Geometry Processing Group. Supervisor: Alla Sheffer

**Teaching Assistant** **Vancouver, Canada** **September 2017 – April 2019**

- *University of British Columbia*, Computer Graphics (Fall '17); Videogame Programming (Spring '18, Spring '19)

## Research Publications

- Polina Zablotskaia, **Edoardo A. Dominici**, Leonid Sigal, Andreas Lehrmann, *PROVIDE: A Probabilistic Framework for Unsupervised Video Composition*, **UAI 2021**
- **Edoardo A. Dominici**, Nico Schertler, Jonathan Griffin, Leonid Sigal, Alla Sheffer, *PolyFit: Perception-aligned Vectorization of Raster Clip-Art via Intermediate Polygonal Fitting,* **SIGGRAPH 2020** (ACM TOG 39(4))
- Shayan Hoshyari, **Edoardo A. Dominici**, Alla Sheffer, Nathan Carr, Zhaowen Wang, Duygu Ceylan, I-Chao Shen, *Perception-Driven Semi-Structured Boundary Vectorization,* **SIGGRAPH 2018** (ACM TOG 37(4))

## Education

**University of British Columbia** **Vancouver, Canada** **September 2017 – May 2020**

- **MSc** in Computer Science, Thesis: Perception-Aligned Vectorization of Raster Clip-Art, Supervisor: Alla Sheffer

**University of Pisa** **Pisa, Italy** **September 2014 – January 2017**

- **BSc** in Computer Science, Thesis: Practical Image Retargeting in Web Pages, Supervisor: Marco Tarini

## Programming Projects

**PolyFit (C++, Eigen) | 2020:** Vectorization of clip-art images. Computes a polygonal approximation through a shortest cycle on the image boundary. The polygon is used to learn which curve primitives to use and as a guide for the non-linear curve fitting.

**Subdivision Surfaces (C, AVX-256) | 2018:** Implementation of surface subdivision schemes for triangular (Loop) and quadrilateral (Catmull-Clark) manifold meshes. Experimenting with SoA layouts and SIMD intrinsics.

**Monte Carlo Path Tracer (C) | 2017:** Multi-threaded unidirectional Monte Carlo path tracer supporting textures, MIS (Direct Lighting), BSDFS (Lambertian, specular, glass). Ray tracing code written from scratch**.**

**Real-time Renderer (C++, Direct3D 11) | 2017:** Forward renderer supporting many lights through screenspace buckets, HDR pipeline with luminosity downsampling and tone mapping, shadows with PCF filtering**.**

**Motion Graphs (Python, OpenGL) | 2017:** Implementation of Motion Graphs, capable of loading and rendering BVH motion sequences, identify similar motion segments and generate interpolating keyframes.

**Constrained Quadratic Programming (C++, Eigen) | 2017:** Finds the minimizer of a quadratic function subject to equality and inequality constraints. Newton's method is applied to the KKT conditions to obtain a search direction which is then refined through Mehortra predictor-corrector logic. Compared to penalty methods.

**WebGL Image Retargeting (C++, WebGL) | 2015:** Stores sparse and compact axis-aligned retargeting solutions as EXIF metadata in JPEG images. A client-side script extracts and interpolates between them in a WebGL canvas to match the resolution inferred from the image style.

**Hackatons (C++, Direct3D 11, OpenGL) | 2013-2015:** Heuristic web scraper (3rd- Hackcortona 2016); 3D sound memory puzzle (2nd- Internet Festival 2015); 2D Maze platformer (Indievault game jam 2016); 2D sidescroller (Global Game Jam 2013);

## Skills

**Languages**: C++, C, Python, JavaScript, MATLAB, SQL

**Software:** Houdini, Blender

**Frameworks:** Direct3D11, OpenGL, Qt, scikit-learn