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); Video Game Programming (Spring '18, Spring '19)

Research Publications

- Polina Zablotskaia, **Edoardo A. Dominici**, Leonid Sigal, Andreas Lehrmann, *Unsupervised Video Decomposition using Spatio-Temporal Iterative Inference*, **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 raster boundary. The polygon is used to model the primitive classification (Random Forest) 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