Rinat Abdrashitov

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ABOUT

Computer graphics engineer and researcher with over three years experience working in industry and publications in top graphics venues. Experienced in designing and implementing algorithms for solving **3D geometry processing** problems as well as strong **C++** and **GPU** programming skills. Experienced in developing **iOS** apps using **Objective-C, UIKit,** and **OpenGL ES.**

EDUCATION

University of Toronto — Toronto, Canada
Ph.D. candidate, Computer Science — 01/2016 – 06/2021 (expected)
Master of Science, Computer Science — 09/2013 – 01/2015
Honors Bachelor of Computer Science with Distinction — 09/2008 – 06/2012

EXPERIENCE

SideFX Software — Toronto, Canada
Research Engineer — intern 05/2019 – 02/2020, part-time 02/2020 - current

- Designed and implemented a non-rigid surface registration algorithm to deform mesh templates to fit partial, incomplete, and noisy **3D mesh scans**.
- Wrote a production-quality nonlinear least squares solver, using **C++** and Eigen, for the core optimization problem, while ensuring speed, robustness, and numerical accuracy.
- Implemented the results of the work using **C++** and **Python** and integrated it into Houdini 18.5 (TopoTransfer Node) which is an industry-standard software used in film, TV, and video games.

University of Toronto — Toronto, Canada
Ph.D. Student (Advisor: Professor Karan Singh) — 01/2016 – 04/2021(expected)

- Performed research in novel interactive techniques for 3D modeling, face animation, and fabrication.
- Solved complex **3D geometry** problems on triangular meshes like segmentation, smoothing, deformation, reconstruction and gained experience in applying **linear algebra** and numerical **optimization** to solve **math computational** problems.
- Used **C++, Python, and OpenGL** to develop interactive research prototypes from scratch.
- Results were published at the top computer graphics and HCI conferences (see publications).

Conceptualiz Inc. — Toronto, Canada
Research Engineer — 02/2015 – 01/2016

- Built an iPad application from the ground up that allows orthopedic surgeons to perform pre-operative planning in a 3D environment using patient-specific CT scan data.
- Developed a custom real-time rendering engine, using **OpenGL ES, GLSL, and C++**, to render high-resolution polygonal models of bone tissue on a mobile **GPU**.
- Gained experience with software design patterns while developing a set of interactive tools for creating implant models to reflect the workflow of orthopedic surgeons.
- The app was successfully released on the **App Store** under the name of Ossa3D and it's the first app

of its kind available on tablet devices.

XtremeLabs Inc. (acquired by Pivotal Software Inc.) Toronto, Canada
Software Developer 09/2012 – 09/2013

- Developed high profile **iOS** applications starting from the concept to submitting the finished product to the **App Store**. Clients included Bell, Mountain Equipment Co-op, and The Globe and Mail.
- Gained experience in object oriented programming using Objective-C and Cocoa toolkit.
- Worked effectively with the QA team to resolve any technical issues and bugs.

RESEARCH INTERNSHIPS

Adobe Research San Jose, CA
Research Intern 06/2017 – 08/2017

- Worked on applying 12 principles of animation to videos of human faces to achieve a stylized effect.
- Used face landmark detection algorithms to extract landmark coordinates over time and used Python to write image warping and signal processing algorithms to generate cartoonish stylized results.
- The results of the research were patented (See patents).

PUBLICATIONS

Interactive Modelling of Volumetric Musculoskeletal Anatomy. *Under review*
Rinat Abdrashitov, Seungbae Bang, Alec Jacobson, David Levin, Karan Singh

Interactive exploration and refinement of facial expression using manifold learning. *UIST 2020*
Rinat Abdrashitov, Fanny Chevalier, Karan Singh

A System for Efficient 3D Printed Stop-Motion Face Animation. *SIGGRAPH 2020*
Rinat Abdrashitov, Alec Jacobson, Karan Singh

Interactive Shape Modeling using a Skeleton-Mesh Co-Representation. *SIGGRAPH 2014*
J. Andreas Bærentzen, Rinat Abdrashitov, Karan Singh.

Mosaic: Sketch-based interface for creating digital decorative mosaics. SBIM 2014
Rinat Abdrashitov, Eric Yao, Emilie Guy, Karan Singh.

TECHNICAL SKILLS

Languages: **C++, C, Python**
Numerics: **MATLAB, NumPy, SciPy, Eigen**
GPU: **OpenGL, GLSL**
Machine Learning: **PyTorch, Linear Algebra, Calculus, Convex Optimization**
Software: **Maya C++/Python API, Houdini, LibIGL**

PATENTS

Reducing collision-based defects in motion-stylization of video content depicting closely spaced features (US Patent granted 2019)
Rinat Abdrashitov, Jose Ignacio Echevarria Vallespi, Jingwan Lu, Elya Shectman, Duygu Ceylan Aksit, David Simons