Rinat Abdrashitov

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ABOUT

Computer graphics engineer and researcher with over two years experience working in industry and publications in top graphics venues. Experienced in designing and implementing algorithms for solving **geometry** processing problems as well as strong **C++** and **3D graphics** programming skills.

EDUCATION

University of Toronto — Toronto, Canada
Ph.D. candidate, Computer Science — 01/2016 – 04/2021 (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 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++ and OpenGL to develop interactive research prototypes.
- 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.

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**
Graphics: **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