

Mikhail Bessmeltsev

Contact

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Professional Experience

Aug 2018 — now	Assistant Professor at <i>Université de Montréal, Département d'Informatique and recherche opérationnelle</i> , Montréal, Canada
Nov 2016 — Aug 2018	Postdoctoral Associate at <i>Massachusetts Institute of Technology (MIT CSAIL)</i> Cambridge, MA, USA. Supervisor: Prof. Justin Solomon
Sep 2010 — Sep 2016	Ph.D. in Computer Science (Computer Graphics) at <i>University of British Columbia</i> Vancouver, Canada, Supervisor: Prof. Alla Sheffer Thesis title: Recovering 3D Shape from Concept and Pose Drawings
2015	Scientific Consultant at <i>Digital Animal Interactive, Inc.</i> , Vancouver, Canada, Supervisor: Ryan Smith Product website: http://ftsy.co/ Consulting on various Computer Vision problems – 3D scanning and reconstruction

Publications

(3 SIGGRAPH 2021 submissions available upon request)

Learning Manifold Patch-Based Representations of Man-Made Shapes by Dmitriy Smirnov, **Mikhail Bessmeltsev**, and Justin Solomon, International Conference on Learning Representations (ICLR), 2021

Integer-Grid Sketch Simplification and Vectorization by Tibor Stanko, **Mikhail Bessmeltsev**, David Bommes, and Adrien Bousseau. Symposium on Geometry Processing, 2020

Placental Flattening via Volumetric Parameterization by S. Mazdak Abulnaga, Esra Abaci Turk, **Mikhail Bessmeltsev**, P. Ellen Grant, Justin Solomon, Polina Golland, MICCAI 2019

Vectorization of Line Drawings via PolyVector Fields by **Mikhail Bessmeltsev** and Justin Solomon, ACM Transactions on Graphics, ACM Transactions on Graphics, Volume 38 Issue 1(SIGGRAPH 2019)

Isometry-Aware Preconditioning for Mesh Parameterization by Sebastian Claiici, **Mikhail Bessmeltsev**, Scott Schaefer, and Justin Solomon. SGP 2017, London.

Gesture3D: Posing 3D Characters via Gesture Drawings by **Mikhail Bessmeltsev**, Nicholas Vining, Alla Sheffer, (SIGGRAPH ASIA 2016)

Recovering 3D Shape from Concept and Pose Drawings by **Mikhail Bessmeltsev**, Ph.D. thesis, University of British Columbia, 2016.

Modeling Character Canvases from Cartoon Drawings by **Mikhail Bessmeltsev**, Will Chang, Nicholas Vining, Alla Sheffer, Karan Singh, ACM Transactions on Graphics, Volume 34, Issue 5, Oct 2015 (SIGGRAPH 2016)

Design-Driven Quadrangulation of Closed 3D Curves by **Mikhail Bessmeltsev**, Caoyu Wang, Alla Sheffer, Karan Singh, ACM Transactions on Graphics (SIGGRAPH ASIA 2012), Volume 31, Issue 5, December 2012 (Acceptance rate: 24%)

Digital Micrography by Ron Maharik, **Mikhail Bessmeltsev**, Alla Sheffer, Ariel Shamir and Nathan Carr, ACM Transactions on Graphics (Proc. SIGGRAPH 2011), Volume 30, Number 4, July 2011 (Acceptance rate: 19%)

Modification of geometrical program modules, tied with construction of modelled probabilistic densities by **Mikhail Bessmeltsev** and Anton Voytishek // Computational Technologies (In Russian) 2011. Volume 16, #4. pp. 19–36.

Self-Organizing Approach to Moving Surface Reconstruction by Mikhail Bessmeltsev // Proceedings of the 9th WSEAS international conference on Signal processing, computational geometry and artificial vision, 2009.

Discrete-Stochastic Method of Moving Adaptive Mesh Generation in 3D by Mikhail Bessmeltsev // In Proc. International Conference on Mathematical Methods in Geophysics "MMG-2008"

Parallel Construction of Moving Adaptive Meshes Based on Self-Organization by Olga Nechaeva and **Mikhail Bessmeltsev** // Berlin: Springer, Lecture Notes in Computer Science, PaCT 2007 proc. (V. Malyshkin, ed.), Vol. 4671, 2007, p. 589-598

Education

- 2010 – 2016 **Ph.D. in Computer Science in Computer Science** — *University of British Columbia*
Completed graduate-level courses on machine learning, computer graphics, computer animation, computational geometry, numerical optimization, and others.
- 2008 – 2010 **M.Sc. in Applied Mathematics and Informatics** — *Novosibirsk State University*
Mechanics and Mathematics Department Novosibirsk, Russia (GPA: 4.82/5.0)
Supervisor: Dr. Olga Nechaeva
Thesis title: Generating moving meshes using Kohonen's Self Organizing Maps
The main focus of the thesis was to develop a markerless motion capture method from laser scan data using neural networks.
- 2004 – 2008 **B.Sc. in Applied Mathematics and Informatics** — *Novosibirsk State University*
Mechanics and Mathematics Department Novosibirsk, Russia (GPA: 4.78/5.0)
Supervisor: Dr. Olga Nechaeva

Awards

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|------|---|--|
| 2015 | (Nominated) UBC Killiam TA award | Computer Science department nomination |
| 2013 | Graduate TA award | UBC Computer Science award for excellence in teaching |
| 2010 | Best business plan | for CatchACloud, a laser scan processing software at Provincial contest of business plans. |
| 2007 | Intel Scholarship | One of ten recipients across Russia |
| 2007 | Excellence in studying | Novosibirsk State University |
| 2006 | Intel Scholarship | One of ten recipients across Russia |

Work Experience

AISoftPro, LLC

Chief Technology Officer (CTO), co-founder

Full-time position
Apr 2009 – Sep 2010

- Making executive-level decisions
- Resolving science and technology related issues
- Presenting the project to potential investors
- Leading development of laser scan processing software
- > 100,000 lines of high-performance C++ code

Virartech, LLC

Project Manager

Part-time position
Dec 2008 – Mar 2009

- Managing development of music-related software
- Teaching in-company courses on Object-Oriented Architecture and Design

GoKillTime, LLC

Software Developer

Part-time position
Jul – Dec 2008

- Game development for mobile platforms (iPhone, Android)

Relevant Activities

R = Reviewer, C = Committee member

Venue	R	C	Years
Summer Geometry Institute (SGI)	×	×	2021
Natural Sciences and Engineering Research Council (NSERC)	×		2020-2021
MITACS	×		2020
Computer Graphics Forum	×		2020
Eurographics Conference	×		2016-2019
Graphics Interface Conference (GI)	×	×	2019-2020
ACM SIGGRAPH Conference on Motion, Interaction and Games (MIG)	×	×	2019-2020
ACM Transactions on Graphics / SIGGRAPH / SIGGRAPH ASIA	×		2017-2021
• Technical papers Conflict of Interest Coordinator		×	2021
• Posters juror		×	2021
PLOS ONE	×		2018-2019
SIAM Journal on Imaging Sciences (SIIMS)	×		2019
Elsevier Computer-Aided Design	×		2015
IEEE Transactions on Visualization and Computer Graphics	×		2014-2020
IEEE Computer Graphics and Applications	×		2020
Elsevier Computer Aided Geometric Design	×		2012-2018
Springer Visual Computer	×		2019
Elsevier Computational Geometry: Theory and Applications (CGTA)	×		2019
Pacific Graphics	×	×	2019, 2020
Israel Science Foundation	×		2019
Journal of Mathematics and the Arts	×		2019
U.S-Israel Binational Science Foundation	×		2019

PhD/MSc Committees

- PhD Comprehensive Exam Committee Member (Prédoc II): Caio José Dos Britos, Elsa Tamisier, Pengbin Tang

- PhD Candidacy Committee (Prédoc III): Jonas Zehnder (chair, 2019), Pengbin Tang (chair, 2020)
- PhD Defense: Donya Ghafourzadeh (ETS, external examiner, 2021), Luis Gamboa (member, 2020), Redha Touati (chair, 2019)
- MSc: Gabriele Prato (chair, 2019)

Intel-NSU High-Performance Systems Lab 2008 – 2010

Team Leader of Geometry Processing Group

- Supervising research of ten undergraduate and graduate students
- Managing the development of all the research software

Intel-NSU High-Performance Computing School Winter 2010

School Coordinator

- Supervision of project leaders
- Assisting leaders and their teams with programming, team management

Intel-NSU High-Performance Computing School Winter 2009

Project Leader of Monte-Carlo traffic simulator

- Project management

Teaching

Université de Montréal

Instructor, IFT 2905 – Intro to Human-Computer Interaction 2021

- Developing and teaching an undergraduate level course
<http://www-labs.iro.umontreal.ca/~bmpix/teaching/2905/>

Instructor, IFT 3355 – Computer Graphics 2020

- Teaching an undergraduate level course
<http://www-labs.iro.umontreal.ca/~bmpix/teaching/3355/>

Instructor, IFT 6112/6113 – Geometric Modeling and Shape Analysis 2018-2020

- Developing and teaching a graduate course
<http://www-labs.iro.umontreal.ca/~bmpix/teaching/6113/>

University of British Columbia

Instructor, CPSC 314 – Computer Graphics 2015

- Revised, improved, and taught an undergraduate course
<https://www.students.cs.ubc.ca/~cs-314/Vsep2015/>

Teaching Assistant 2010-2014

- CPSC 314 Computer Graphics
- CPSC 213 Introduction to Computer Systems
- CPSC 259 Data Structures and Algorithms
- CPSC 424 Geometric Modeling
- CPSC 524 Digital Geometry Processing

Lecturing, leading tutorials and lab sessions

Novosibirsk State University

Instructor, Undergraduate course on Geometry Processing 2009 – 2010

- Developed and taught a complete undergraduate course

Teaching assistant, Fine-Grained Parallelism and Cellular Automata 2008

- Designing and teaching lab sessions

Supervision

Supervising 2 PhD students (2019 —), 1 MSc student (2020 —) + 2 undergraduate students (2019,2021):

- Kirill Brodt (PhD student, 2019 – now)
- Ivan Puhachov (PhD student, 2019 – now)
- William Neveu (MSc student, 2020 – now)
- Charlotte Beauchemin (BSc student / IFT3150 Projet Informatique 2021)
- Potok Irvine (BSc student / IFT3150 Projet Informatique, 2019)
- Queenie Zhang (co-supervision, BSc student, Massachusetts Institute of Technology, 2017)
- Drew Leung (co-supervision, BSc student, University of British Columbia, 2013)

In the Media

1. “Smoothing out sketches’ rough edges”, MIT News (featured as a spotlight on Sept, 11, 2018):
<http://news.mit.edu/2018/automated-vectorization-algorithm-animation-0911>
2. “Mikhail Bessmeltsev and his colleague developed new algorithms for vector graphics”
Habr (In Russian): <https://habr.com/post/422977/>
3. “University of Montreal and MIT announced an algorithm to automatically generate vector images without tracing errors”,
Shiropen (In Japanese): <https://shiropen.com/seamless/vectorization-of-line-drawings-via-polyvector-fields>
4. “Using algorithms to build a map of placenta”
MIT News: <http://news.mit.edu/2019/using-algorithms-to-build-placenta-map-1002>