Joey Litalien

Rendering & ML Researcher / Engineer

Neural rendering · Implicit scene representations · 3D reconstruction

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Core Experience

2023	**Research Intern**, Adobe Research — *AI & Graphics* Developed Monte Carlo methods for neural product important sampling using normalizing flows Mentor: Iliyan Georgiev
2021	**Research Intern**, Reality Labs Research, Meta — *Display Systems Research* Explored large-scale neural implicit scene representations using volume-surface differentiable rendering Mentors: Feng Liu & Lei Xiao
2020–2021	**Research Intern**, NVIDIA Research — *AI Lab & Hyperscale Graphics* Developed the first real-time rendering algorithm for neural signed distance fields on sparse octrees Designed a hybrid differentiable renderer for single-image 3D reconstruction using spherical Gaussian priors Mentors: Sanja Fidler & Morgan McGuire

Academic Experience & Service

2024	**Program Committee**, AAAI
2018–Present	**Reviewer**, ACM SIGGRAPH, CVPR, ICCV, ECCV, IEEE TVCG, Computer & Graphics, and Pacific Graphics
2022	**Guest Lecturer**, *Photorealistic Image Synthesis*, ÉTS, Montréal
2019	**Guest Lecturer**, *Fundamentals of Computer Graphics*, McGill University
2018–2019	**Teaching Assistant**, *Realistic Image Synthesis*, McGill University

Education

2019–2024	**Doctor of Philosophy (Ph. D.)**, Electrical & Computer Engineering, McGill University Conducted research at the intersection of **image synthesis** and **machine learning** for 3D content creation Thesis: *Statistical and Learning-based Methods for High-performance Rendering* Advisor: Derek Nowrouzezahrai
2017–2018	**Master of Engineering (M. Eng.)**, Electrical & Computer Engineering, McGill University
2012–2015	**Bachelor of Science (B. Sc.)**, Joint Honours Mathematics & Computer Science, McGill University

Publications (* denotes equal contribution)

2024	**Neural Product Importance Sampling via Warp Composition** **J. Litalien**, M. Hašan, F. Luan, K. Mullia & I. Georgiev *ACM SIGGRAPH Asia* (*Conference Proceedings*), To appear, July 2024
2021	**DIB-R++: Learning to Predict Lighting and Material with a Hybrid Differentiable Renderer** W. Chen, **J. Litalien**, J. Gao, Z. Wang, C. Fuji Tsang, S. Khamis, O. Litany & S. Fidler *Neural Information Processing Systems* (*NeurIPS*), May 2021
2021	**Neural Geometric Level of Detail: Real-time Rendering with Implicit 3D Shapes** T. Takikawa*, **J. Litalien***, K. Yin, K. Kreis, C. Loop, D. Nowrouzezahrai, A. Jacobson, M. McGuire & S. Fidler *Computer Vision and Pattern Recognition* (*CVPR*), Oral, January 2021
2020	**Delayed Rejection Metropolis Light Transport** D. Rioux-Lavoie*, **J. Litalien***, A. Gruson, T. Hachisuka & D. Nowrouzezahrai *ACM Transactions on Graphics* (*TOG*), 39(3), May 2020

Softwares

2022 | **Kaolin Wisp,** *a PyTorch library and engine for neural fields research*
T. Takikawa, O. Perel, C. Fuji Tsang, C. Loop, **J. Litalien**, J. Tremblay, M. Shugrina & S. Fidler

Fellowships & Awards

2022 | **Meta Research Ph. D. Fellowship** (AR/VR Computer Graphics) (Top 1.5%)
2021 | Facebook Fellowship Award (AR/VR Computer Graphics) – *Finalist* (Top 3.5%)
2019 | Natural Sciences & Engineering Research Council of Canada (NSERC) – Postgraduate Scholarship
2019 | McGill Engineering Doctorate Award / Hydro-Québec Doctoral Fellowship in Engineering
2017–2018 | Graduate Excellence Fellowship Awards

Talks & Leadership

2024 | **Neural Materials: A New Paradigm for Photorealistic Appearances**, ÉTS, Montréal
Keynote / Invited by Montreal ACM SIGGRAPH

2022 | **Real-time Rendering of Neural Implicit 3D Shapes**, EPFL, Lausanne, Switzerland
Talk / Invited by Wenzel Jakob

2017–Present | **GRAPHQUON,** *an annual graphics research seminar*, East Coast, Canada
Organized virtual colloquium (2020) and contributed technical talks (2017/18/19/23)

2017 | **ACM SIGGRAPH Student Volunteer Program,** Los Angeles, USA
Supported the conference by ensuring the smooth functioning of operations (talks & main exhibitions)

2013–2016 | **Seminars in Undergraduate Mathematics in Montreal,** *a nonprofit student organization*
Organized weekend-long seminars where students (≈100) can share and discuss mathematical research

Skills

Programming | Python 3 · C++17 / C · Bash — Familiarity with CUDA · GLSL · OpenGL
Frameworks | PyTorch · Mitsuba 3 · Kaolin · pybind11 / nanobind — Familiarity with TensorFlow · JAX
Tools | Linux · git · CMake · Docker · slurm · Visual Code · Photoshop / Illustrator · Blender · LaTeX
Languages | English (full professional proficiency) · French (mother tongue)