Hisanari Otsu

Personal Data

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Github:	https://github.com/hi2p-perim

Research Interests

Image synthesis in computer graphics:

- Physically based rendering
- Light transport simulation
- Markov chain Monte Carlo (MCMC) rendering
- High-performance rendering

Research Experience

Nov 2025 - **Assistant professor** at *Université de Sherbrooke*, Sherbrooke, Canada

Sep 2022 - Oct 2024 **Postdoctoral Researcher** at *McGill University*, Montreal, Canada

Apr 2023 - Oct 2024 **Postdoctoral Researcher** at *Ubisoft La Forge*, Montreal, Canada

- Conducting collaborative research on real-time global illumination (GI) with Ubisoft La Forge under the chair of Prof. Derek Nowrouzezahrai.
- Designed the architecture for the real-time raytracing facility for in-house prototyping framework. Implemented latest real-time global illumination techniques (ReSTIR DI and GI) on the framework.
- Initiated and co-leading research projects to improve the performance of cache-based and resampling-based GI techniques (total: 6 topics).
  - Collaborated with the Ubisoft's internal game engine team in the process of the project definition.
  - Involved in the intern student hiring process for the project.
  - Supervision of the student interns.

Apr 2018 - Mar 2022 | **Postdoctoral Researcher** at *Karlsruhe Institute of Technology*, Karlsruhe, Germany

- Conducted research projects on MCMC rendering under Prof. Carsten Dachsbacher focusing on the performance improvement of MCMC rendering via adaptive mutation kernels.
- *Geometry-Aware Adaptation.* Conducted the project focusing on the geometric adaptation of the mutation kernels for MCMC rendering. Developed a novel mutation technique for challenging geometric configurations utilizing the user-defined information.
- *Adaptation By Sample History.* Explored the possibility to use history of samples for automatically adapt the mutation kernels, based on the theory of adaptive MCMC or autotuning.

Apr 2015 - Mar 2018 | **Ph.D. Student** at *The University of Tokyo*, Tokyo, Japan

- Conducted a variety of research on physically based rendering and light transport simulation, under Prof. Toshiya Hachisuka.
- *MCMC Rendering.* Conducted a research project on MCMC rendering to unify the mutation strategies defined for different sample space, achieving better sample exploration.
- *Data-Driven Approaches in Rendering.* Developed a data-driven spectrum reconstruction technique of reluctance spectra, usable for spectral rendering. Also, developed a data-driven rendering strategy selection technique that make it possible to select suitable rendering technique by sample history.
- *Research-Oriented Renderer.* Designed and implemented physically based rendering framework suitable for feature extension and authoring the experiments. Many of my research projects were conducted on the framework.

Teaching Experience

Nov 2025 - | **Assistant professor** at *Université de Sherbrooke*, Sherbrooke, Canada

Sep 2022 - Oct 2024 | **Postdoctoral Researcher** at *McGill University*, Montreal, Canada

Apr 2023 - Oct 2024 | **Postdoctoral Researcher** at *Ubisoft La Forge*, Montreal, Canada

- *Student Group.* Leading the student group at Ubisoft La Forge (a group of all student interns from various universities mainly in Canada and France). Organizing the bi-weekly *reading* group to enhance the communication between the student interns and the visibility of the researches conducted by students in different teams.
- *Supervision of Interns.* Supervising the students for the real-time global illumination projects at Ubisoft La Forge.

Apr 2018 - Mar 2022 | **Postdoctoral Researcher** at *Karlsruhe Institute of Technology*, Karlsruhe, Germany

- *Seminar.* Organized and co-hosted the graduate-level seminar course for light transport simulation. The students are asked to choose a state-of-the-art paper on the field, followed by the in-depth technical report on the paper and the presentation. Conducted the regular in-person meetings with the students.
- *Course Exams.* Involved in the process of making exams for bachelor-level computer graphics courses.
- *Supervision of Bachelor / Master Students.* Provided the thesis research topics for the bachelor and master students (total: 5 students). Conducted a supervision in the period of the research. Hosted regular meetings with students, provided the general research directions and helped to solve their technical difficulties.

Apr 2015 - Mar 2018 | **Ph.D. Student** at *The University of Tokyo*, Tokyo, Japan

- *Teaching Assistant.* Served a teaching assistant for the graduate-level computer graphics course focusing on photo-realistic image synthesis. Graded the coding assignments and reports by the students.

Education

Apr 2015 - Mar 2018 | Ph.D. in Information Science and Technology
Graduate School of Information Science and Technology
The University of Tokyo, Tokyo, Japan
Advisor: Prof. Toshiya Hachisuka
Thesis: *Bridging Different Spaces in Light Transport Simulations*

Apr 2013 - Mar 2015 | Master of Information Science and Technology
Graduate School of Information Science and Technology
The University of Tokyo, Tokyo, Japan
Advisor: Prof. Reiji Suda
Thesis: *Optimized Path Sampling Strategy Selection for Trans-Dimensional Mutation in Metropolis Light Transport*

Apr 2009 - Mar 2013 | Bachelor of Science
School of Science
The University of Tokyo, Tokyo, Japan
Advisor: Prof. Tomoyuki Nishita
Thesis: *A Study on Global Illumination Computation Using Replica Exchange Light Transport in Locality-Relaxed Light Path Space*

Publications

[1] **Hisanari Otsu**, Killian Herveau, Johannes Hanika, Derek Nowrouzezahrai, and Carsten Dachsbacher. Regional adaptive metropolis light transport, 2024. Preprint: arXiv:2402.08273.

[2] Killian Herveau, **Hisanari Otsu**, and Carsten Dachsbacher. Out-of-the-loop autotuning of metropolis light transport with reciprocal probability binning. In *Eurographics 2023 - Short Papers*. The Eurographics Association, 2023.

[3] **Hisanari Otsu**, Johannes Hanika, and Carsten Dachsbacher. Portal-Based Path Perturbation for Metropolis Light Transport. In *Vision, Modeling, and Visualization*. The Eurographics Association, 2020.

[4] **Hisanari Otsu**, Johannes Hanika, Toshiya Hachisuka, and Carsten Dachsbacher. Geometry-aware metropolis light transport. *ACM Transactions on Graphics (Proc. of SIGGRAPH Asia)*, 37(6):278:1–278:11, 2018.

[5] **Hisanari Otsu**, Yamamoto Masafumi, and Toshiya Hachisuka. Reproducing spectral reflectances from tristimulus colours. *Computer Graphics Forum*, 37(6):370–381, 2018.

[6] **Hisanari Otsu**, Shinichi Kinuwaki, and Toshiya Hachisuka. Supervised learning of how to blend light transport simulations. In *Monte Carlo and Quasi-Monte Carlo Methods (MCQMC 2016)*, pages 409–427, 2018.

[7] **Hisanari Otsu**, Anton Kaplanyan, Johannes Hanika, Carsten Dachsbacher, and Toshiya Hachisuka. Fusing state spaces for Markov chain Monte Carlo rendering. *ACM Transactions on Graphics (Proc. SIGGRAPH)*, 36(4):74:1–74:10, 2017.

[8] Martin Šik, **Hisanari Otsu**, Toshiya Hachisuka, and Jaroslav Křivánek. Robust light transport simulation via Metropolised bidirectional estimators. *ACM Transactions on Graphics (Proc. SIGGRAPH Asia)*, 35(6):245:1–245:12, 2016.

[9] **Hisanari Otsu**, Yonghao Yue, Qiming Hou, Kei Iwasaki, Yoshinori Dobashi, and Tomoyuki Nishita. Replica exchange light transport on relaxed distributions. *ACM SIGGRAPH 2013 Posters*, 2013.

Academic Services

Reviewer Experience

- SIGGRAPH (2020, 2021, 2023, 2024)
- SIGGRAPH Asia (2015, 2020)
- Eurographics (2020)
- Eurographics Symposium on Rendering (2015, 2019)
- Computer Graphics Forum (2022, 2024)
- Transactions on Visualization and Computer Graphics (2025)
- Pacific Graphics (2020)
- Computer Graphics International (2017)
- The Visual Computer (2017)
- Computers & Graphics (2021)
- Graphics Interface (2021)

Awards

2016	**Super Creator** MITOU Program, The Ministry of Economy, Trade and Industry, Japan
2013	**Dean's Award** Department of Information Science, The University of Tokyo, Japan

Languages

Japanese:	Native
English:	Professional working proficiency
German:	Beginner
French:	Beginner

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