

# Hisanari Otsu

## PERSONAL DATA

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LINKEDIN: <https://www.linkedin.com/in/hisanari-otsu>  
GITHUB: <https://github.com/hi2p-perim>

## RESEARCH INTERESTS

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### Image synthesis in computer graphics:

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

## RESEARCH EXPERIENCE

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SEP 2022 - PRESENT

**Postdoctoral Researcher** at *McGill University*, Montreal, Canada

APR 2023 - PRESENT

**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.

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| APR 2018 - MAR 2022 | <p><b>Postdoctoral Researcher</b> at <i>Karlsruhe Institute of Technology</i>, Karlsruhe, Germany</p> <ul style="list-style-type: none"> <li>• Conducted research projects on MCMC rendering under Prof. Carsten Dachsbacher focusing on the performance improvement of MCMC rendering via adaptive mutation kernels.</li> <li>• <i>Geometry-Aware Adaptation</i>. 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.</li> <li>• <i>Adaptation By Sample History</i>. Explored the possibility to use history of samples for automatically adapt the mutation kernels, based on the theory of adaptive MCMC or autotuning.</li> </ul>   |
| APR 2015 - MAR 2018 | <p><b>Ph.D. Student</b> at <i>The University of Tokyo</i>, Tokyo, Japan</p> <ul style="list-style-type: none"> <li>• Conducted a variety of research on physically based rendering and light transport simulation, under Prof. Toshiya Hachisuka.</li> <li>• <i>MCMC Rendering</i>. Conducted a research project on MCMC rendering to unify the mutation strategies defined for different sample space, achieving better sample exploration.</li> <li>• <i>Data-Driven Approaches in Rendering</i>. 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.</li> <li>• <i>Research-Oriented Renderer</i>. 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.</li> </ul> |

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## TEACHING EXPERIENCE

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| SEP 2022 - PRESENT  | <p><b>Postdoctoral Researcher</b> at <i>McGill University</i>, Montreal, Canada</p> <p><b>Postdoctoral Researcher</b> at <i>Ubisoft La Forge</i>, Montreal, Canada</p> <ul style="list-style-type: none"> <li>• <i>Student Group</i>. 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 <i>reading</i> group to enhance the communication between the student interns and the visibility of the researches conducted by students in different teams.</li> <li>• <i>Supervision of Interns</i>. Supervising the students for the real-time global illumination projects at Ubisoft La Forge.</li> </ul> |
| APR 2023 - PRESENT  |   |
| APR 2018 - MAR 2022 | <p><b>Postdoctoral Researcher</b> at <i>Karlsruhe Institute of Technology</i>, Karlsruhe, Germany</p>   |

- *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.

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## 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*

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## 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 Krivánek. 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

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### Reviewer Experience

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

## AWARDS

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| 2016 | <b>Super Creator</b><br>MITOU Program, The Ministry of Economy, Trade and Industry, Japan |
| 2013 | <b>Dean's Award</b><br>Department of Information Science, The University of Tokyo, Japan  |

## LANGUAGES

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- JAPANESE: Native  
ENGLISH: Professional working proficiency  
GERMAN: Beginner

Updated: April 24, 2024