Kiyohiro (George) Nakayama

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OBJECTIVE

I'm an about-to-be-master student at Stanford University of class of 2024. I major in mathematics, with the plan of pursuing a PhD degree in computer graphics. My research interests lie in computer vision and graphics and other machine learning areas that use interesting mathematical methods.

EDUCATION

Stanford University — Stanford, California, USA
M.S. Computer Science, Expected 2025 — 2024 - 2025 (expected)
Stanford University — Stanford, California, USA
B.A. Mathematics, Expected Fall 2024 — GPA: 4.04/4.00 — 2019 - 2024

SELECTED COURSEWORK AND LAGUAGES

- **Applied Math:** linear and quadratic optimization, geometric and topological data analysis, bayesian statistics.
- **Computer Science:** theory of computation, algorithms, computer systems, parallel computing, computer graphics, computer animation, simulation, computer vision, machine learning, Computer Vision, Natural Language Processing and Understanding.
- **Mathematics:** algebraic topology, differential topology, riemannian geometry, harmonic analysis, functional analysis, PDEs, measure theory and lebesgue integration, probability theory, groups and rings, galois theory, representation theory.
- **Languages:** Mandarin, Japanese, English (All native levels), C++, C, Python, Pytorch, Jax, Jittor, LaTeX

PUBLICATIONS

AIpparel: A Large Multimodal Generative Model for Digital Garments
Kiyohiro Nakayama*, Timur Kesdogan*, Jan Ackmann*, Yang Zheng, Maria Korosteleva, Leonidas Guibas, Olga Sorkine-Hornung, Guandao Yang, Gordon Wetzstein
(Under Review)

ProvNeRF: Modeling per Point Provenance in NeRFs as a Stochastic Process
George Kiyohiro Nakayama, Mikaela Angelina Uy, Yang You, Ke Li, Leonidas Guibas
Advances on Neural Information Processing Systems (**NeurIPS**), 2024

Semantic-Aware Transformation-Invariant RoI Align
Guo-Ye Yang, **George Kiyohiro Nakayama**, Zi-Kai Xiao, Tai-Jiang Mu, Sharon Xiaolei Huang, Shi-Min Hu
AAAI Conference on Artificial Intelligence, 2024

NeRF Revisited: Fixing Quadrature Instability in Volume Rendering
Mikaela Angelina Uy, **George Kiyohiro Nakayama**, Guandao Yang, Rahul Krishna Thomas, Leonidas Guibas, Ke Li
Advances on Neural Information Processing Systems (**NeurIPS**), 2023
Website: `https://pl-nerf.github.io`

DiffFacto: Controllable Part-Based 3D Point Cloud Generation with Cross Diffusion
George Kiyohiro Nakayama, Mikaela Angelina Uy, Jiahui Huang, Shi-Min Hu, Ke Li, Leonidas Guibas
International Conference of Computer Vision (**ICCV**), 2023
Website: `https://difffacto.github.io`

EXPERIENCE

Stanford University — California, USA
Research Assistant — April 2024, – Present
- Physics-based sound synthesis of underwater bubbles with complex geometry in arbitrary domain.
- Advisor: Professor Doug James

Stanford University — California, USA
Research Assistant — May 2024, – Present
- Multimodal sewing pattern generation and reasoning
- Advisor: Professor Gordon Wetzstein

Stanford University — California, USA
Research Assistant — October, 2022 – Present
- User friendly controllable shape generation with reformulated diffusion model via shape decomposition.
- Modeling per-point provenance in a pre-trained NeRF for downstream applications.
- Advisor: Leonidas Guibas

Tsinghua University Beijing, China
Research Assistant Janurary, 2022 – August, 2022
- 2D Image Segmentation with an attention-based, aspect-ratio aware feature extraction method.
- Advisor: Professor Shi-Min Hu.

Yau Mathematical Science Center Beijing, China
Visiting Student November, 2021 – April, 2022
- Nonlinear dispersive equations: low regularity, including mass critical/subcritical and energy critical/subcritical, local wellposedness theory of power-type semilinear Schrödinger's equations.
- Advisor: Professor Pin Yu

University of California, Los Angeles California, USA
Undergraduate Researcher, Research in Industrial Projects for Students (RIPS) June, 2021 – August, 2021
- Predicting Start-Up Behavior of Heat Pipes and Vapor Chambers from Frozen State. Numerical simulations of multi-phase flow and free boundary problems.
- HRL Labotory

Stanford University Online
Undergraduate Researcher, Mathematics Department June, 2020 – August, 2020
- Theories of the Allen-Cahn Equation: general properties, classical solutions on $\mathbb{R}^2$, $\mathbb{R}^3$, and $\mathbb{S}^n$.
- Advisor: Jared Marx-Kuo

Ross Mathematics Program Online
Counselor June, 2020 – July, 2020
- Led daily lectures about elementary number theoretic topics. Graded students' problem sets and offered feedback on their work. Developed my leadership communication skills in mathematics.

ACADEMIC ACHIEVEMENTS

Qualification of USA Math Olympaid Spring 2017

INVITED TALKS

IGARASHI Laboratory March 2024
Host: Professor Takeo Igarashi

Graphics and Geometric Computing Group at Tsinghua University December 2023
Host: Professor Shi-min Hu

Stanford G-Cafe April, 2023

References available upon request.

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