

# Lantao Yu

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## CONTACT INFORMATION

Adobe Inc.  
345 Park Ave, San Jose, CA 95110  
☎ (+1) 832-289-4138  
✉ [complexfiltering@gmail.com](mailto:complexfiltering@gmail.com)  
🌐 [complexfilter.github.io](https://github.com/complexfilter)  
Google Scholar:<https://scholar.google.com/citations?user=B1fy-hYAAAAJhl=en>

## RESEARCH INTERESTS

**Computational Photography, Image Processing, Computer Vision, Machine Learning**

## EDUCATION

**Rice University**, Houston, TX, USA  
• *Doctor of Philosophy*, in Electrical and Computer Engineering 05/15/2021  
• *Master of Science*, in Electrical and Computer Engineering 05/14/2016

**Tianjin University**, Tianjin, CN 09/2008 - 07/2012  
• *Bachelor of Engineering*, in Measuring and Control Technology and Instrument

**Linchuan No.1 Middle School**, Jiangxi, CN 08/2007 - 06/2008  
• Repreparation for National College Entrance Examination

**Le'An No.2 Middle School**, Jiangxi, CN 09/2004 - 06/2007  
• High School

## PROFESSIONAL EXPERIENCE

**Adobe Inc.** 345 Park Ave, San Jose, CA 95110  
COMPUTER SCIENTIST 4 01/27/2023 - now  
COMPUTER SCIENTIST 3 08/23/2021 - 01/26/2023

**Implement** align and merge algorithm (the core technology for camera ISP)

- **Implement** the merge part of align and merge
- **Model** noise distribution in align and merge
- **Mitigate** the artifacts in align and merge near high-contrast regions

**Build** auto exposure (AE) algorithm

- **Calibrate** noise model parameters for iPhone camera sensors
- **Design** loss function to balance controlling clipped highlights with improving SNR
- **Design** PID control algorithm for ZSL AE

**Optimize** on-device speed using C++/Halide

**Validate** off-line algorithm using Python and pybind

**Facebook Inc.** 1 Hacker Way, Menlo Park, CA 94025  
RESEARCH INTERN WITH DR. TODD KEELER 06/01/2020 - 08/21/2020

**Test** and implement deep learning-based optical flow estimation algorithms on neural processing unit (NPU) for virtual reality (VR) headset.

- Test the runtime of well-known FlowNet, FlowNet-2, RAFT algorithms on GPU and NPU.
- Develop the optimal downsampling operator in terms of prediction accuracy.

- Address the blocky artifacts of RAFT.
- Optimize RAFT with shorter runtime and acceptable prediction error.

**Mitsubishi Electric Research Laboratories** 201 Broadway, 8th floor, Cambridge, MA 02139  
RESEARCH INTERN WITH DR. DEHONG LIU 05/20/2019 - 08/23/2019

**Research** on blind fusion for remote-sensing multi-spectral and panchromatic images [5, 6].

- Propose a novel, state-of-the-art model for estimating the blur kernel coefficients.
- Propose a state-of-the-art pansharpening model for estimating high-resolution multi-spectral images.
- Build novel models for dehazing remote-sensing imagery.
- One patent granted on blind multi-spectral image fusion [P1].

**Rice University** 6100 Main St, Houston, TX 77025  
RESEARCH ASSISTANT WITH PROF. MICHAEL ORCHARD 01/07/2013 - 08/22/2021

**Research** on modeling the location-related and non-local features for image processing using complex-valued image presentation framework and manifold-inspired models.

- Model non-redundant complex-valued coefficients for image compression.
- Propose world's first two-dimensional, non-redundant, multi-resolution, multi-directional complex-valued representation.
- Work on improving the selection of similar patches in extremely aliased regions for exploiting non-local similarity for image interpolation, with state-of-the-art PSNR [7].
- Develop parallel algorithm to exploit non-local similarity with improved selection of similar patches in mildly aliased regions for image interpolation [3, 4].
- Identify the accurate locations of edges for quantifying the motion of human retinal imagery, with sub-pixel accuracy [2].
- Unravel aliased co-located bands of coefficients for reconstructing the interpolated images [1].

**SKILLS** Python, MATLAB, PyTorch, C++, Halide

**SELECTED PUBLICATIONS**

[11] Yuanhao Gong, Lantao Yu, Meng Xu and Miaohui Wang, "IRSnet: Implicit Residual Solver Network with Only 3K Parameters for Total Variation Minimization", submitted *ACM MM*, 2023.

[10] Zichuan Liu, Ke Wang, Lantao Yu and Xin Lu, "I-Matting: Improved Trimap-free Image Matting", submitted *ICCV*, 2023.

[9] Yuanhao Gong, Wenming Tang, Lebin Zhou, Lantao Yu and Guoping Qiu, "A Discrete Scheme for Computing Image's Weighted Gaussian Curvature", *Proc. ICIP*, 2021.

[8] Yuanhao Gong, Wenming Tang, Lebin Zhou, Lantao Yu and Guoping Qiu, "Quarter Laplacian Filter for Edge Aware Image Processing", *Proc. ICIP*, 2021.

[7] Lantao Yu, Kuida Liu, and Michael T. Orchard, "Manifold-Inspired Single Image Interpolation", *IEEE Transactions on Image Processing*, submitted (<https://arxiv.org/abs/2108.00145>).

[6] Lantao Yu, Dehong Liu, Hassan Mansour, and Petros T. Boufounos, "Fast and High-Quality Blind Multi-spectral Image Pansharpening", *IEEE Transactions on Geoscience and Remote Sensing*, 2021.

[5] Lantao Yu, Dehong Liu, Hassan Mansour, Petros T. Boufounos, and Yanting Ma, "Blind Multi-spectral Image Pan-sharpening", *Proc. ICASSP*, 2020.

[4] Lantao Yu and Michael T. Orchard, "When Spatially-Variant Filtering Meets Low-Rank

Regularization: Exploiting Non-Local Similarity for Single Image Interpolation”, *Proc. ICIP*, 2019.

[3] Lantao Yu and Michael T. Orchard, “Single Image Interpolation Exploiting Semi-Local Similarity”, *Proc. ICASSP*, 2019.

[2] Lantao Yu and Michael T. Orchard, “Accurate Edge Location Identification Based on Location-directed Image Modeling”, *Proc. ICIP*, 2019.

[1] Lantao Yu and Michael T. Orchard, “Location-directed Image Modeling and its Application to Image Interpolation”, *Proc. ICIP*, 2018.

**PATENTS** [P1]. Dehong Liu, Lantao Yu, Hassan Mansour, Petros Boufounos, Yanting Ma, “Systems and Methods for Blind Multi-Spectral Image Fusion”, US 20210319534A1.

<b>HONORS AND AWARDS</b>	<b>National Scholarship</b> from Ministry of Education of China	09/2011
	<b>Rice Graduate Fellowship</b> from Rice University	08/2012 - 05/2013
	<b>Rice Engineering Alumni Travel Award</b> from Rice University	02/2019, 09/2019
	<b>Travel Award</b> from IEEE Signal Processing Society	10/2018
	<b>Honorable Mention in Mathematical Contest in Modeling</b> from COMAP	02/2012

**PAPER REVIEW** ACM Transactions on Graphics  
IEEE Transactions on Image Processing  
IEEE Transactions on Multimedia  
IEEE Transactions on Circuits Systems and Video Technology  
ICASSP 2021  
ICASSP 2022  
ICASSP 2023

<b>REFERENCES</b>	Prof. Michael Orchard, Rice University	orchard@rice.edu
	Dr. Dehong Liu, Mitsubishi Electric Research Laboratories	liudh@merl.com