

# Samuel Chun-Pong Lau

Department of Computer Science, Johns Hopkins University

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## Education

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<b>Johns Hopkins University</b>	USA
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<i>Ph.D. in Computer Science</i>	2020-Present
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- Affiliation: Artificial Intelligence for Engineering and Medicine Lab, Mathematical Institute for Data Science
- Advisor: Prof. Rama Chellappa

<b>University of Maryland, College Park</b>	USA
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<i>M.S. in Applied Mathematics and Scientific Computation</i>	2018-2020
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- Affiliation: University of Maryland Institute for Advanced Computer Studies
- Advisor: Prof. Rama Chellappa
- GPA: 3.84/4.0

<b>The Chinese University of Hong Kong</b>	Hong Kong
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<i>M.Phil. in Mathematics</i>	2016-2018
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- Advisor: Prof. Ronald Lok Ming Lui
- GPA: 3.85/4.0

<b>The Chinese University of Hong Kong</b>	Hong Kong
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<i>B.Sc. in Mathematics, Second Class Honors Upper Division</i>	2012-2016
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- Streams: Enrichment Stream in Mathematics, Computational and Applied Mathematics Stream

## Research Interest

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Image Restoration, Face Recognition, Adversarial Robustness, Generative Model, Scientific Computing

## Publications and Preprints

### Submitted

- PH MA, **CP Lau**, N Yu, A Li, JP Sheng, Application of Deep Learning for Image-based Chinese Food Nutrients Estimation. Under review.
- **CP Lau**, J Liu, H Sourì, WA Lin, S Feizi, R Chellappa, Dual Manifold Attacks: Mixing up Adversarial Perturbations between Ambient and Latent Spaces. Under review
- J Liu, **CP Lau**, S Feizi, R Chellappa, Mutual Adversarial Training: Exploiting the Transferability of Robustness. Under review
- P Khorramshahi, H Sourì, **CP Lau**, R Chellappa, Reverse Engineering of Adversarial Attacks. Under review

### Published/Accepted

- [9] **CP Lau**, C Castillo, R Chellappa, ATFaceGAN: Single Face Semantic Aware Image Restoration and Recognition from Atmospheric Turbulence. *IEEE Transactions on Biometrics, Behavior, and Identity Science (TBIOM)*. (2021)
- [8] PH MA, **CP Lau**, N Yu, A Li, JP Sheng, Q Wang, P Liu, Image-based Nutrient Estimation for Chinese Dishes Using Deep Learning, *Food Research International* (2021)

- [7] **CP Lau**, A Kumar, R Chellappa, AT-Key: Semi-Supervised Landmarks Guided Restoration of Atmospheric Turbulent Images, *IEEE Journal of Selected Topics in Signal Processing (JSTSP)*.(2021)
- [6] WA Lin<sup>1</sup>, **CP Lau**<sup>1</sup>, A Levine, R Chellappa, S Feizi, Dual Manifold Adversarial Robustness: Defense against Lp and non-Lp Adversarial Attacks, *Conference on Neural Information Processing Systems (NeurIPS)* (2020)
- [5] WH Chak, **CP Lau**, LM Lui, Subsampled Turbulence Removal Network. *Journal on Mathematics, Computation and Geometry of Data* (2020)
- [4] **CP Lau**, H Sourì, R Chellappa, ATFaceGAN: Single Face Image Restoration and Recognition from Atmospheric Turbulence. *IEEE International Conference and Workshops on Automatic Face and Gesture Recognition* (2020) (Oral) (Honorable Mention Award)
- [3] **CP Lau**, YH Lai, LM Lui, Restoration of Atmospheric Turbulence-distorted Images via RPCA and Quasiconformal Maps. *Inverse Problem* (2019).
- [2] **CP Lau**, YH Lai, LM Lui, Variational models for joint subsampling and reconstruction of turbulence-degraded images. *Journal of Scientific Computing*, 1-38 (2018).
- [1] **CP Lau**, CP Yung, LM Lui, Image retargeting via Beltrami representation. *IEEE Transactions on Image Processing (TIP)*, 27(12), 5787-5801 (2018).

## Selected Awards

<b>NeurIPS 2020</b>	<b>USA</b>
o Travel Award	2020
<b>University of Maryland, College Park</b>	<b>USA</b>
o Dean's Fellowship	2018-2020
<b>2017 Imaging Science Camp, VISSA</b>	<b>Shenzhen, China</b>
o Presidential Prize for Best Presentation by Prof. Tony F. Chan	2017
<b>The Chinese University of Hong Kong</b>	<b>Hong Kong</b>
o Postgraduate Studentship	2016-2018

## Talks

1. SIAM Conference on Imaging Science (IS18), June 5-8, 2018, Bologna, Italy  
Title: Variational Models for Joint Subsampling and Reconstruction of Turbulence-degraded Images
2. (Invited talk) The International Conference on Image Processing: Theory, Method and Applications (ICIPTMA), May 19-21, 2017, Heilongjiang, China  
Title: Restoration of Atmospheric Turbulence-distorted images via RPCA and Quasiconformal Maps
3. 2017 Imaging Science Camp, March 10-12, 2017, Shenzhen, China  
Title: Restoration of Atmospheric Turbulence-distorted images via RPCA and Quasiconformal Maps

## Professional Service

<b>Reviewer</b>	<b>2018-present</b>
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<sup>1</sup> First two authors contributed equally

- *IEEE Transactions on Multimedia*
- *IEEE Transactions on Computational Imaging*
- *AAAI Conference on Artificial Intelligence*
- *Conference on Computer Vision and Pattern Recognition (CVPR)*
- *International Conference on Computer Vision (ICCV)*

## Professional Experience

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### Department of Electrical and Computer Engineering, Johns Hopkins University

- *Teaching Assistant* 2020-2021
  - EN.520.650 Machine Intelligence. Spring 2021
  - EN.520.665 Machine Perception. Fall 2020

### Department of Mathematics, University of Maryland, College Park

- *Teaching Assistant* 2018-2019
  - MATH120 Elementary Calculus I. Spring 2019
  - MATH141 Calculus II. Fall 2018

### Department of Mathematics, The Chinese University of Hong Kong

- *Teaching Assistant* 2016-2018
  - MATH4250 Game Theory. Spring 2018
  - MATH3360 Mathematical Imaging. Fall 2017.
  - MATH4250 Game Theory. Spring 2017.
  - MATH3360 Mathematical Imaging. Fall 2016.

### Department of Mathematics, The Chinese University of Hong Kong

- *Research Internship* 2015-2016
  - Conducted research in Convolutional Neural Network with applications to computer vision under the supervision of Prof. Ronald Lok Ming Lui.
  - Conducted research in Quasi-conformal Geometry with applications to motion frames interpolation under the supervision of Prof. Ronald Lok Ming Lui.

### MATLAB, Hong Kong

- *Seminar Helper* 2013-2016
  - To assist the facilitator by keeping attendance, helping with registration and setting up the electronic appliances.

## Membership

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- Student Member of Society for Industrial and Applied Mathematics (SIAM)
  - Student Member of Institute of Electrical and Electronics Engineers (IEEE)

## Relevant Course Work

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- **Graduate:**
    - Statistical Pattern Recognition
    - Image Understanding
    - Advanced Numerical Optimization
    - Image Processing and Computer Vision

- Estimation and Detection Theory
- Compressive Sensing
- Theory of Partial Differential Equations
- Random Processes for Communication and Control
- Computer Organization and Programming for Scientific Computing
- Advanced Numerical Analysis I
- Undergraduate:
  - Mathematical Imaging
  - Numerical Method for Differential Equations
  - Algebra I and II
  - Game Theory
  - Introduction to Topology
  - Real Analysis

## Computer Skills

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- Python, MATLAB, C++
- Deep Learning: Pytorch, Tensorflow

## Personal Information

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- Address: Room 224, Hackerman Hall, 3101 Wyman Park Dr, Baltimore, MD 21218
- Languages: English (Fluent), Cantonese Chinese (Native), Mandarin Chinese (Fluent)

Last updated: February 1, 2021