Curriculum Vitae

Ka Hung, CHAN
PhD Candidate, Department of Mechanical and Aerospace Engineering
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Professional Summary

Innovative PhD with a strong foundation in mechanical engineering and extensive hands-on experience in custom scientific instrumentation. Proven track record in designing, developing, and commissioning advanced optical microscopy systems, including building optical microscopes and developing software for experiments. Passionate about pushing spatial resolution limits and automating complex experimental setups, with a demonstrated ability to work independently and collaboratively in interdisciplinary research environments.

Education:

PhD in Mechanical Engineering (2019 – May 2025, expected)
- Hong Kong PhD Fellowship Scheme
- The Hong Kong University of Science and Technology

Bachelor of Engineering (2015 – 2019)
- *First Class Honors; Minors in Physics, Astrophysics and Cosmology*
- The Hong Kong University of Science and Technology

Technical and instrumentation skills

- **Synchrotron Techniques:** Microdiffraction (Beamline 12.3.2, ALS) | X-ray Scattering (SAXS, WAXS, GIWAXS, GISAXS at Beamline 7.3.3, ALS)

- **Instrumentation Design & Development:**

  Custom optical microscope design for specimen positioning at a synchrotron beamline and develop python scripts for automated data analysis

- **Software & Data Analysis:**

  Programming: Python, MATLAB
  Machine Learning: Developed indexing-free ML algorithms for diffraction data

- **Engineering Design:**

  CAD (SolidWorks) and rapid prototyping for experimental instrumentation

Research & Instrumentation Experience

PhD Thesis: Development and Applications of Quantitative Differential Interference Microscopy

- Pioneering new optical characterization methods for experimental mechanics

- Characterizing microstructures of materials under stress-induced phase transformations.

ALS Doctoral Fellowship *(Beamline 12.3.2, Advanced Light Source, Lawrence Berkeley National Laboratory)*

- Performed microdiffraction experiments at Beamline 12.3.2 to investigate thermally and stress-induced phase transformations in materials.

- Designed and built an optical microscope for precise specimen positioning

- Developed and implemented machine-learning algorithms to label grain orientations in Laue microdiffraction data.
- Performed **SAXS, WAXS, GIWAXS, and GISAXS** experiments at Beamline 7.3.3 and writing custom Python scripts for automated data analysis.

Selected Achievements & Awards

- 2023 – Present: ALS Doctoral Fellowship
- 2019 – 2023: Hong Kong PhD Fellowship Scheme (*HKD 200k by RGC, Hong Kong*)
- 2019: First Class Honor, Bachelor of Engineering, HKUST

Selected Publication:

- **KH. Chan**, S. Du and X. Chen, Sub-nanometer accuracy of surface characterization by reflected-light differential interference microscopy, Measurement Science and Technology, (2022)

- M Karami, Z Zhu, **KH. Chan**, P Hua, N Tamura, X Chen, Nondissipative Martensitic Phase Transformation after Multimillion Superelastic Cycles, Physical Review Letters, (2024)

- Y. Wang*, **KH. Chan***, G. Freychet, P. Wasik, S. Zhang, Z. Cao, X. Gu, Resonant Tender X-Ray Scattering for Disclosing the Backbone Conformation of Conjugated Polymers, Macromolecules, (2025) (submitted)

- **KH. Chan**, X. Huang, N. Tamura, X. Chen, Physics-informed Machine Learning for High-Resolution Grain Mapping in X-ray Laue diffraction, Journal of Applied Crystallography, (2025) (submitted)

PATENT:

- **KH. Chan**, X. Chen, S. Du, Prism-free differential interference microscope with tunable beam shear distance, US 63/593,540, Oct 27 2023, provisional claim

REFERENCES

- Dr. Sherry Chen (PhD Supervisor)
  Associate Professor, The Hong Kong University of Science and Technology
  Email: xianchen@ust.hk

- Dr. Nobumichi Tamura (Beamline Scientist, ALS 12.3.2)
  Senior Scientist, Advanced Light Source, Lawrence Berkeley National Laboratory
  Email: ntamura@lbl.gov

- Dr. Shengwang Du (Optical design advisor)
  Professor of Electrical and Computer Engineering, Professor of Physics and Astronomy
  Email: dusw@purdue.edu