

KHANH DUY NGUYEN

PH.D. CANDIDATE · QUANTUM SCIENCE AND ENGINEERING

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Education

The University of Chicago

PHD IN QUANTUM SCIENCE AND ENGINEERING

Chicago, IL

2021 - present

The University of Chicago

MSC IN QUANTUM SCIENCE AND ENGINEERING (INCIDENTAL) - GPA: 3.92/4

Chicago, IL

2025

Tohoku University

BS IN PHYSICAL CHEMISTRY - GPA: 3.99/4

Sendai, Japan

2021

Positions

- 2021 - Now **Graduate Research Assistant**, Pritzker School of Molecular Engineering, University of Chicago
- 2020 - 2021 **Visiting Researcher**, Photon Factory - Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), Japan
- 2019 - 2021 **Undergraduate Researcher**, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

Research Experience

University of Chicago - Pritzker School of Molecular Engineering

Chicago, IL

ADVISOR: DR. SHUOLONG YANG

Sept. 2021 - Present

- Thesis: Engineering and investigating magnetic topological insulator structures for enhancing quantum behaviors
- Building UHV systems for *in situ* MBE-grown thin-film manipulation
- Developing physics models and calculations to capture and explain experimental data, including *Boltzmann transport model*, *Anderson-Kondo model*, *electron-polaronic bands*, *effects on topological surface states*, *band nesting susceptibility*

Tohoku University - Institute of Multidisciplinary Research for Advanced Materials

Sendai, Japan

ADVISORS: DR. HIROSHI KUMIGASHIRA AND DR. KOHEI YOSHIMATSU

2019 - 2021

- Thesis: "Synthesis and control of quantum wells in $\text{SrNbO}_3/\text{SrTiO}_3$ ultrathin films"

KEK - Institute of Materials Structure Science - Photon Factory

Tsukuba, Japan

SUPERVISOR: DR. KUMIGASHIRA

2020 - 2021

- Synthesis and characterization of functional oxides by laser-MBE and synchrotron light-based spectroscopies

Honors and Awards

- January 2025 **Young Scientist Award**, The 50th Conference on the Physics and Chemistry of Surface and Interfaces (PCSI-50), Kona, Hawaii, USA
- 2017-2021 **Japanese Government (MEXT) Scholarship**, Japan
- 2016 **Talent Nuture Scholarship**, Hanoi, Vietnam
- 2016 **Gold Medal in the 48th International Chemistry Olympiad (IChO)**, Tbilisi, Georgia

Publications

8. W. Lee, Q. Gao, Y. Zhao, H. Li, A. Tsui, Y. Zhang, Y. Bai, H. Lin, **K. D. Nguyen**, G. Berruto, G. Yan, J. Dang, T. Wu, H. Rokni, T. Marchese, Y. S. Meng, C.-X. Liu, X.-X. Zhang, C. Liu, P. Y. Huang, M. C. Hersam, B. Yan, S.-L. Yang, Two-Dimensional Topological Insulators with Millimetre-Scale Uniformity, *in review* (2025)

7. Q. Gao, G. Berruto, **K. D. Nguyen**, C. Hu, H. Lin, B. Goh, B. G. Jang, X. Xu, P. Littlewood, J.-H. Chu, S.-L. Yang, Electronic ordering driven flat band nesting in van der Waals magnet Fe_5GeTe_2 , arXiv:2508.03116 *in review* (2025)
6. H. Lin, C. Jacobs, C. Yan, G. Nolan, G. Berruto, P. Singleton, **K. D. Nguyen**, Y. Bai, Q. Gao, X. Wu, C.-X. Liu, G. Yan, S. Choi, C. Liu, N. Guisinger, P. Huang, S. Mandal, S.-L. Yang, A Topological Superconductor Tuned by Electronic Correlations, arXiv:2503.22888 *in review* (2025)
5. **K. D. Nguyen**, G. Berruto, S. H. Lee, Y. Bai, H. Lin, Q. Gao, Z.-Q. Mao, S.-L. Yang, Spectroscopic evidence of intra-unit-cell charge redistribution in a charge-neutral magnetic topological insulator, *Nanoscale* **17**, 10663 (2025)
4. **K. D. Nguyen**, W. Lee, J. Dang, T. Wu, G. Berruto, C. Yan, C. I. Ip, H. Lin, Q. Gao, S. H. Lee, B. Yan, C.-X. Liu, Z. Mao, X.-X. Zhang, S.-L. Yang, Distinguishing Surface and Bulk Electromagnetism via Their Dynamics in an Intrinsic Magnetic Topological Insulator, *Science Advances* **10**, eadn5696 (2024)
3. R. Hayasaka*, T. Kanda*, Y. Masutake*, **K. D. Nguyen***, N. Hasegawa, S. Inoue, A. Wada, M. Kitamura, D. Shiga, K. Yoshimatsu, H. Kumigashira, Common anion rule in oxide heterointerfaces: Experimental verification by in situ photoemission spectroscopy, *APL Materials* **12**, 071111 (2024) (*Equal contribution)
2. C. I. Ip, Q. Gao, **K. D. Nguyen**, C. Yan, G. Yan, T. Marchese, M. Zhang, W. Lee, H. Rokni, S. Y. Meng, C. Liu, S.-L. Yang, Preservation of Topological Surface States in Millimeter-Scale Transferred Membranes, *Nano Letters* **24**, 25, 7557–7563 (2024)
1. T. Kanda, D. Shiga, R. Yukawa, N. Hasegawa, **K. D. Nguyen**, X. Cheng, R. Tokunaga, M. Kitamura, K. Horiba, K. Yoshimatsu, and H. Kumigashira, Electronic structure of $\text{SrTi}_{1-x}\text{V}_x\text{O}_3$ films studied by in situ photoemission spectroscopy: Screening for a transparent electrode material, *Physical Review B* **104**, 115121 (2021)

Academic Service

Reviewer: Physical Review Letters, Physical Review B, Physical Review Research

Mentoring

Summer 2024	Research Advisor , Summer research of the REU student in Yang lab, University of Chicago
Winter 2024	Teaching Assistant , Intermediate Quantum Engineering II, University of Chicago
Spring 2023	Teaching Assistant , Science of Materials, University of Chicago
2020-2021	Academic Mentor , Undergraduate Physics and Math: Mechanics, Electromagnetism, Calculus, Linear Algebra - Tohoku University

Doctoral-level Coursework

Quantum Physics-Quantum Information: Graduate Quantum Mechanics, Graduate Statistical Mechanics, Advanced Quantum Engineering, Advanced Quantum Information and Computation, Applied Scientific Computing in Molecular Engineering, Quantum Molecular and Materials Modeling

Condensed Matter Physics: Graduate Solid State Physics, Advanced Condensed Matter Physics, Superconductivity and Superfluidity, Topological Phases in Condensed Matter

Advanced Field Theory: Quantum Field Theory, Advanced Statistical Mechanics