

Vanessa Carling Kwong

skwon056@ucr.edu | linkedin.com/in/vanessa-ch/ | veecarling.github.io

RESEARCH INTERESTS

- Optics and transport in two-dimensional van der Waals heterostructure devices

EDUCATION

University of California, Riverside

Oct 2020 – Mar 2025

B.S. in Physics (Standard)

Relevant Coursework: Condensed Matter Physics, Computational Physics, Classical Mechanics, Electromagnetism, Electromagnetic Waves, Quantum Mechanics, Thermodynamics / Statistical Mechanics, Introductory Computer Science, Introductory Biochemistry, Organic Chemistry

EXPERIENCE

The Joe Lab at UC Riverside

Riverside, CA

External Researcher

Apr 2025 - Present

- Independent research project on contact engineering to develop low temperature, Ohmic contacts to p-type monolayer WSe₂ testing quantum transport; expand my project to other types of TMDs, namely MoSe₂ and WS₂
- Assist in various graduate projects through designing, patterning, and training others with nanofabrication equipment, building expertise in these tools
- Prepare monthly presentations on project progression and relevant papers

Undergraduate Researcher

Oct 2023 - Mar 2025

- Demonstrated expertise in fabricating reliable van der Waals devices through precise patterning and dry transfer of mechanically exfoliated 2D materials; Trained incoming undergraduates on these techniques, improving lab efficiency and technical skills
- Conducted optical and electrical measurements and data analyses for novel devices
- Built, used, and set up equipment in new laboratory space, training users on laboratory / clean-room facility for nanoscale engineering

UC Riverside Research in Science and Engineering (RISE)

Riverside, CA

Undergraduate Researcher

Jun 2024 – Aug 2024

- Conducted independent research on fabrication and developing platinum contacts and testing contact resistance for transition metal dichalcogenide (TMD) devices
- Presented topic to over 250 multidisciplinary researchers, faculty, and guests
- Assisted in fabrication of graphene heterostructures for magnetotransport in search of the quantum anomalous Hall effect
- Advisor: Prof. Andrew Joe

PRESENTATIONS AND EVENTS

Undergraduate Presentation for Congressman Mark Takano's Visit

Riverside, CA

Presenter

Apr 2025

- Invited by UC Riverside's College of Natural and Agricultural Sciences dean and divisional deans to present research, projects, and experience

- Emphasize and advocate for undergraduate research funding to Congressman Mark Takano effectively

CSU San Bernardino calSWIFT'25 Symposium

San Bernardino, CA

Panelist

Apr 2025

- California Semiconductor Workforce Development & Innovation for Future Technologies
- Panelist speaker for Student Experiences in Semiconductor Research

Students Transforming Through Research (CUR-STR) Program

Washington, DC

Undergraduate Advocate

Mar 2025

- Represent University of California, Riverside and the UC system in communicating and advocating for undergraduate research to stakeholder groups at Capitol Hill, including California senators Adam Schiff and Alex Padilla, and Representative Mark Takano

142W Capstone Final Project Presentation

Riverside, CA

Oral Presenter

Dec 2024

- Capstone presentation, "Advances in Monolayer TMD Heterostructure Devices"

UC Riverside RISE Program Symposium

Riverside, CA

Oral Presenter

Aug 2024

- Oral presentation on low-temperature device measurements and background on platinum contact development for WSe₂-based devices for Hall and transport data

UC Riverside Undergraduate Research Symposium

Riverside, CA

Oral Presenter

May 2024

- Talk on emerging research within TMD heterostructure devices and their optical measurements, analyses, and relevance in materials science and engineering for future optoelectronics

Mutating AT3G08680 to Determine Functional Redundancy

Riverside, CA

Oral Presenter

Mar 2021

Los Angeles County Science and Engineering Fair

Pasadena, CA

Oral Presenter

Mar 2018

PROJECTS

Transport in Monolayer WSe₂ Heterostructure Devices

Jun 2024 - Present

- Fabricated and electrically tested monolayer WSe₂ semiconducting devices for transport properties through observations of Shubnikov-de Haas oscillations

Pulsed Nuclear Magnetic Resonance

Nov 2024 - Dec 2024

- Measured and analyzed spin-spin relaxation and spin-lattice relaxation times for water, glycerin, and various concentrations of Fe³⁺ samples to relate magnetic moments in liquids respective to viscosity and paramagnetic impurities ; PHYS 142W

Gamma Ray Emission of Radioactive Isobars

Nov 2024

- Measured and analyzed spectra of various radioactive materials to determine their decay paths and nuclear energy levels; PHYS 142W

Noise Fundamentals

Oct 2024

- Determine resistance dependence of Johnson noise and photodiode current dependence of Shot noise; PHYS 142W

Laser Dispersion Calculation Program

Mar 2024 - Apr 2024

- Developed and implemented program to relate diffraction grating and placement to dispersion of light from supercontinuum laser by selected wavelength

Mutagenesis of KOIN and WFL in *A. thaliana*

Feb 2021 - Mar 2021

- Conducted gene knockout experiments to assess functionality and redundancy of WFL and KOIN genes in *Arabidopsis thaliana*, analyzing resulting phenotypic variations

PLTW Biomedical Sciences Capstone Research

Oct 2019 - Jun 2020

- Independent research on effectiveness of natural preservatives in limiting bacteria growth

Microbiological Analysis Glove Materials in Bacterial Penetration

Oct 2017 - Mar 2018

- Study effectiveness between latex, nitrile, and vinyl gloves in preventing bacterial penetration through serial dilutions and incubation

SKILLS

Laboratory: Mechanical Exfoliation, Dry Transfer, Sputtering, Atomic Force Microscopy (AFM), Atomic Layer Etching (ALE), Soldering, Optical Path Setup, Electron-beam Evaporation (EBE) & Lithography (EBL), Spectroscopy, Spectrophotometry

Programming: C++, Python, MATLAB, HTML, CSS, JavaScript

Other: LATEX, CAD (KLayout, AutoCAD), Excel

Languages (Spoken): English (Native), Cantonese (Native), Mandarin (Fluent)

AWARDS

UC Riverside College of Natural & Agricultural Sciences Dean's List

3rd Place Microbiology Senior in LA County Science and Engineering Fair (2018)

REFERENCES

Available upon request.