

Franklin Liou

650-796-5737 • fliou@berkeley.edu • github.com/i02132002 • LinkedIn:franklin-liou

EDUCATION

Ph.D. Physics, UC Berkeley, Berkeley, CA	2022
B.S. Physics, Stanford University, Stanford, CA	2011-2015

FELLOWSHIPS

Kavli ENSI Philomathia Graduate Student Fellowship, UC Berkeley, CA	2020-2021
The Data Incubator Data Science Fellowship	2022

TECHNICAL SKILLS

DATA ANALYSIS: Python (NumPy, SciPy, Pandas, Matplotlib, Scikit-learn) | Machine learning (regression, clustering, neural network) | Image Processing | MATLAB | Git | SQL | Spark | Linux

EXPERIMENTAL SKILLS: fabrication technology (photolithography, e-beam lithography, wet etching, plasma etching, FIB, wirebonding), microscopy and metrology (AFM, SEM, TEM), ultra-high vacuum, cryogenics, automation (Arduino, LABVIEW, Raspberry Pi), feedback control, lock-in detection

SELECTED PUBLICATIONS

- **F. Liou**, H.-Z. Tsai, *et al.* "Imaging gate-induced molecular melting on a graphene field-effect transistor." [arXiv:2211.13198](https://arxiv.org/abs/2211.13198) (in preparation).
- **F. Liou**, H.-Z. Tsai, *et al.* "Imaging reconfigurable molecular concentration on a graphene field-effect transistor." *Nano Letters* 21, 8770-8776 (2021).
- H.-Z. Tsai, J. Lischner, A. A. Omrani, **F. Liou**, *et al.* "A molecular shift register made using tunable charge patterns in one-dimensional molecular arrays on graphene." *Nature Electronics* 3, 598-603 (2020)
- H. Ryu, Y. Chen, H. Kim, H. Tsai, S. Tang, J. Jiang, **F. Liou**, *et al.* "Persistent Charge-Density-Wave Order in Single-Layer TaSe₂." *Nano Letters*, 18 (2018)
- G. D. Nguyen, H. Tsai, A. Omrani, T. Marangoni, M. Wu, D. J. Rizzo, G. F. Rodgers, R. R. Cloke, R. A. Durr, Y. Sakai, **F. Liou**, *et al.* "Atomically precise graphene nanoribbon heterojunctions from a single molecular precursor." *Nature Nanotechnology*, 12 (2017)
- R. Bassiri, M. Abernathy, **F. Liou**, *et al.* "Order, disorder and mixing: The atomic structure of amorphous mixtures of titania and tantalum." *J. Non-crystalline Solids* 438, 59 (2016)
- R. Bassiri, F. Liou *et al.* "Order within disorder: the atomic structure of ion-beam sputtered amorphous tantalum (a-Ta₂O₅)." *APL Materials* 3, 036103 (2015)

RESEARCH EXPERIENCE

Crommie group, Department of Physics, UC Berkeley, CA 2016-2022

Engineered graphene devices using microfabrication techniques (photolithography and e-beam lithography, plasma etching, wet etching, FIB) in a cleanroom environment. Used scanned probe microscopy to image the motion of charge-tunable molecules on graphene devices. Developed computer-automated experiment to control and characterize molecular surface diffusion. Analyzed over 10GB of video data to extract molecular trajectories, molecular orientation, motion and structural correlation to study gating effects.

Manoharan group, Department of Physics, Stanford, CA

2012-2015

Developed MATLAB code to simulate quantum scattering in 1D corrals. Vectorized code to efficiently calculate material band structure over a large number of basis atoms.

Fejer group, Ginzton Laboratory, Stanford, CA

2014

Developed MATLAB code to perform PCA analysis on EXAFS data from amorphous mirror coatings for fitting atomic structure model.

PROJECTS

Decentralmate: a web application for estimating virtual real estate prices in Decentraland

Constructed, tested and validated a random forest model in scikit-learn that estimates sale prices of virtual land in the game Decentraland. An interactive Streamlit app was deployed showing parcels currently for sale and their estimated price.

Pyrover: A wifi-controlled home rover

A compact battery-powered rover platform written in python on raspberry pi, controlled via a webpage.

PRESENTATIONS

- April 2021: Presented talk at Kavli Nanoscience Institute Seminar: Imaging dynamical molecular control at the surface of a graphene FET
- March 2017: Presented talk at Graphene Conference 2017, Barcelona, Spain: "Atomically precise graphene nanoribbon heterojunctions."
- September 2014: Presented poster at LIGO-Virgo Collaboration Conference: "Probing the atomic structure of amorphous tantalum with EXAFS."
- August 2013: Presented poster at Stanford Physics Undergraduate Summer Research Poster Session: "Imaging fractional charge in one-dimensional topological solitons."
- August 2012: Presented poster at Stanford Physics Undergraduate Summer Research Poster Session: "Charge fractionalization in molecular graphene."

TEACHING EXPERIENCE

- Teaching Assistant, Advanced Experimentation Lab, Department of Physics, UC Berkeley 2015-2016
- Teaching Assistant, Physics 7B, Department of Physics, UC Berkeley 2015

REFERENCES

Prof. Michael F. Crommie

Professor of Physics, UC Berkeley

366 Le Conte Hall #7300

Berkeley, CA 94720-7300

Work: (510) 642-3316

Email: crommie@berkeley.edu

Relationship: Doctoral thesis advisor

Dr. Johannes Lischner

Reader in Theory and Simulation of Materials, Imperial College London

342 Bessemer Building

Imperial College London

Price Consort Rd

London SW7 2BB, UK.

Work: +44 (0)20 7594 9949

Email: j.lischner@imperial.ac.uk

Relationship: Research collaborator

Dr. Riccardo Bassiri

Senior Research Scientist, Stanford University

301 Ginzton Laboratory,

348 Via Pueblo

Stanford, CA 94305

Work: (650) 725-2291

Email: rbassiri@stanford.edu

Relationship: Research supervisor