

Amalya Johnson

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EDUCATION

Stanford University, Stanford, CA **Admitted 2020**

PhD Candidate: Materials Science & Engineering

TomKat Center for Sustainable Energy Graduate Fellow

Stanford University, Stanford, CA

September 2022

MS: Materials Science & Engineering

Columbia University, Columbia College, New York, NY

May 2020

Bachelors: Physics, Women's & Gender Studies

RESEARCH APPOINTMENTS

Stanford University, Stanford, CA **2020-**

Graduate Research Assistant, TomKat Graduate Fellow

- Studies the thermal and electronic properties of two-dimensional (2D) materials under Prof. Fang Liu
- Develops novel materials fabrication procedures to manipulate phonon and charge transport within van der Waals materials and across heterostructure interfaces
- Performed MeV-UED experiments at SLAC National Accelerator Laboratory to measure interfacial energy transport in twisted van der Waals heterostructures. Built Python library using Pandas, NumPy, Scipy etc. for analysis of 1TB of diffraction image data
- Developed Python package for multilayer heat diffusion in nanomaterials to fit experimental data acquired from Raman spectroscopy and Time-Domain Thermoreflectance studies on strained monolayer materials
- Builds ultrafast optical setups and uses Python to automate experimental hardware and conduct real time analysis and modeling

Toyota Research Institute, Los Altos, California

2024

Accelerated Materials Design & Discovery Research Intern

- Developed a Python package using interpretable machine learning models to predict materials properties from experimental and simulated spectroscopy data
- Used random forests and regularized linear regression to highlight important features for prediction of different properties and improve model interpretability
- Built a Streamlit app to share software with research and manufacturing teams across the company

Lawrence Berkeley National Laboratory, Berkeley, California

2023-2024

Department of Energy Graduate Student Research Fellow

- Awarded US Department of Energy research fellowship to conduct doctoral research studying thermal transport in 2D materials at Lawrence Berkeley National Laboratory under Dr. Archana Raja
- Facilitated and lead collaboration between home research group and staff scientists across the laboratory, securing 2 user proposals to conduct experiments at Lawrence Berkeley National Laboratory and SLAC National Laboratory

GRANTS

Graduate Fellowship for Translational Research, *Stanford TomKat Center for Sustainable Energy* **2023**

Office of Science Graduate Student Research Program, *US Department of Energy* **2023**

Enhancing Diversity in Graduate Education Fellowship, *Stanford University* **2020**

ACADEMIC AWARDS

Inclusion & Advocacy Leadership and Excellence Award, <i>Columbia University</i>	2020
Multicultural Graduation Cord, <i>Columbia University</i>	2020
Summer Funding Award, <i>Columbia University</i>	2019
Research Experience for Undergraduates Fellowship, <i>National Science Foundation</i>	2018
Dean's List, <i>Columbia University</i>	2016-2019

PUBLICATIONS

1. **A. C. Johnson**, J. D. Georganas, X. Shen, H. Yao, A. P. Saunders, H. J. Zeng, H. Kim, A. Sood, T. F. Heinz, A. M. Lindenberg, Hidden phonon highways promote photoinduced interlayer energy transfer in twisted transition metal dichalcogenide heterostructures. *Science Advances* **10**, eadj8819 (2024).
2. F. Pan, X. Li, **A. C. Johnson**, S. Dhuey, A. Saunders, M.-X. Hu, J. P. Dixon, S. Dagli, S.-C. Lau, T. Weng, Room-temperature valley-selective emission enabled by planar chiral quasi-bound states in the continuum. *arXiv preprint arXiv:2409.09806* (2024).
3. A. P. Saunders, V. Chen, J. Wang, Q. Li, **A. C. Johnson**, A. S. McKeown-Green, H. J. Zeng, T. K. Mac, M. T. Trinh, T. F. Heinz, Direct exfoliation of nanoribbons from bulk van der Waals crystals. *Small*, 2403504 (2024).
4. G. Zaborski Jr, P. E. Majchrzak, S. Lai, **A. C. Johnson**, A. P. Saunders, Z. Zhu, Y. Deng, D. Lu, M. Hashimoto, Z. Shen, Macroscopic uniform 2D moiré superlattices with controllable angles. *arXiv preprint arXiv:2407.02600* (2024).
5. C. Heide, Y. Kobayashi, **A. C. Johnson**, T. F. Heinz, D. A. Reis, F. Liu, S. Ghimire, High-harmonic generation from artificially stacked 2D crystals. *Nanophotonics* **12**, 255–261 (2023).
6. J. Shi, H. Xu, C. Heide, C. HuangFu, C. Xia, F. de Quesada, H. Shen, T. Zhang, L. Yu, A. Johnson, Giant room-temperature nonlinearities in a monolayer Janus topological semiconductor. *Nature Communications* **14**, 4953 (2023).
7. N. S. Mueller, R. Arul, G. Kang, A. P. Saunders, **A. C. Johnson**, A. Sánchez-Iglesias, S. Hu, L. A. Jakob, J. Bar-David, B. de Nijs, Photoluminescence upconversion in monolayer WSe₂ activated by plasmonic cavities through resonant excitation of dark excitons. *Nature Communications* **14**, 5726 (2023).
8. Q. Li, J.-H. Song, F. Xu, J. van de Groep, J. Hong, A. Daus, Y. J. Lee, **A. C. Johnson**, E. Pop, F. Liu, A Purcell-enabled monolayer semiconductor free-space optical modulator. *Nature Photonics* **17**, 897–903 (2023).
9. Y. Kobayashi, C. Heide, **A. C. Johnson**, V. Tiwari, F. Liu, D. A. Reis, T. F. Heinz, S. Ghimire, Floquet engineering of strongly driven excitons in monolayer tungsten disulfide. *Nature Physics* **19**, 171–176 (2023).
10. Y. Liu, S. C. Lau, W.-H. Cheng, **A. Johnson**, Q. Li, E. Simmerman, O. Karni, J. Hu, F. Liu, M. L. Brongersma, Controlling Valley-Specific Light Emission from Monolayer MoS₂ with Achiral Dielectric Metasurfaces. *Nano letters* **23**, 6124–6131 (2023).
11. C. Heide, Y. Kobayashi, **A. C. Johnson**, F. Liu, T. F. Heinz, D. A. Reis, S. Ghimire, Probing electron-hole coherence in strongly driven 2D materials using high-harmonic generation. *Optica* **9**, 512–516 (2022).
12. Y. Kobayashi, C. Heide, H. K. Kelardeh, **A. Johnson**, F. Liu, T. F. Heinz, D. A. Reis, S. Ghimire, Polarization flipping of even-order harmonics in monolayer transition-metal dichalcogenides. *Ultrafast Science* (2021).
13. M. E. Putman, Y. Zheng, A. M. Price-Whelan, J. Grcevich, **A. C. Johnson**, E. Tollerud, J. E. Peek, The gas content and stripping of Local Group dwarf galaxies. *The Astrophysical Journal* **913**, 53 (2021).

14. B. Snios, **A. C. Johnson**, P. E. Nulsen, R. P. Kraft, M. De Vries, R. A. Perley, L. Sebokolodi, M. W. Wise, The X-Ray Cavity Around Hotspot E in Cygnus A: Tunneled by a Deflected Jet. *The Astrophysical Journal* **891**, 173 (2020).

CONFERENCE PRESENTATIONS

“SpectraScope—A Toolkit for Materials Characterization from Spectral Data” Materials Research Society Fall Meeting. Poster.	2024
“Photoinduced Interlayer Heat Transfer in Two-Dimensional TMDC Heterobilayers Visualized by Femtosecond Electron Diffraction” Materials Research Society Spring Meeting. Poster.	2023
“Photoinduced Interlayer Heat Transfer in Two-Dimensional TMDC Heterobilayers Visualized by Femtosecond Electron Diffraction” SLAC National Accelerator Laboratory 2022 SSRL/LCLS Users’ Meeting. Poster.	2022
“Dynamic DNA Nano-Architectures” Columbia Undergraduate Research Symposium. Poster.	2019
“The X-ray cavity around hotspot E in Cygnus A: a bubble inflated by the outgoing jet” American Astronomical Society Winter Meeting. Poster.	2019
“Ricocheting black hole jet discovered by <i>Chandra</i> ” American Astronomical Society Winter Meeting. Press Release.	2019
“The Stellar Kinematics of E+A Galaxies using SDSS IV-MaNGA” American Astronomical Society Winter Meeting. Poster.	2018

LEADERSHIP EXPERIENCE

Stanford Black Graduate Student Association , Stanford, CA <i>Communications Chair</i>	2022-2023
Stanford Materials Science & Engineering DEI Taskforce , Stanford, CA <i>Community Participant</i>	2020
Columbia Physics Department , New York, NY <i>Teaching Assistant</i>	2020
Columbia University Women’s Soccer Team , New York, NY <i>Team Captain</i>	2016-2020

TECHNICAL SKILLS

Programming languages:

Python, R

Selected tools:

ASE, LAMMPS, Pymatgen, Pandas, NumPy, SciPy, Scikit-Learn, Streamlit, Jupyter Notebooks

Experimental Techniques:

Atomic Force Microscopy, Raman spectroscopy, Photoluminescence Spectroscopy, Reflection Contrast Spectroscopy, Time-Domain Thermoreflectance spectroscopy, Ultrafast Electron Diffraction, 2D Materials fabrication