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 excitonic 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
- Builds ultrafast optical setups and uses Python to automate experimental hardware and conduct real time analysis and modeling
- Developed Python package modeling multilayer anisotropic heat diffusion in nanomaterials using finite difference analysis

Toyota Research Institute, Los Altos, California **2024**
Accelerated Materials Design & Discovery Research Intern

- Developed a Python package using Scikit-Learn to predict materials properties from experimental and simulated spectroscopy data
- Used random forests and regularized linear regression to highlight important features for prediction of materials 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 at Lawrence Berkeley National Laboratory (LBL) under Dr. Archana Raja
- Facilitated and lead collaboration between home research group and staff scientists at LBL, securing 2 user proposals to conduct experiments at LBL and SLAC National Accelerator 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**
EDGE Doctoral Fellowship, *Stanford University* **2020**

ACADEMIC AWARDS

Inclusion & Advocacy Leadership and Excellence Award, *Columbia University* **2020**
Multicultural Graduation Cord, *Columbia University* **2020**
Summer Funding Award, *Columbia University* **2019**
Research Experience for Undergraduates Fellowship, *National Science Foundation* **2018**

Dean's List, *Columbia University* **2016-2019**

PUBLICATIONS

1. **A. C. Johnson**, J. D. Georgaras, 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" **2024**
Materials Research Society Fall Meeting. Poster.

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

LEADERSHIP EXPERIENCE

Stanford Black Graduate Student Association, Stanford, CA **2022-2023**
Communications Chair
Stanford Materials Science & Engineering DEI Taskforce, Stanford, CA **2020**
Community Participant
Columbia Physics Department, New York, NY **2020**
Teaching Assistant
Columbia University Women's Soccer Team, New York, NY 2**016-2020**
Team Captain

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