

Jason Lynch

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Stanford University

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Education

<i>University of Chicago</i>	Physics and Molecular Engineering (Double Major)	B.S., 2019
<i>University of Pennsylvania</i>	Nanotechnology	M.S., 2021
<i>University of Pennsylvania</i>	Electrical and Systems Engineering	PhD, 2021-2026

Professional Preparation

- ORISE IC Fellow in Materials Science and Engineering **09/2026-Present**
Stanford University, Palo Alto, CA, USA with Mark Brongersma
- Ashton Fellow and Graduate Research Assistant in Electrical and Systems Engineering **2021-2026**
University of Pennsylvania, Philadelphia, PA, USA with Deep Jariwala

Awards & Fellowships

- *ORISE IC Fellowship* **2026-Present**
- *AVS NSTD Graduate Student Awards* **2025**
- Ashton Fellowship, *University of Pennsylvania* **2021-2026**
- JVST A Young Author Award, *Journal of Vacuum Science & Technology A* **2022**
- Outstanding Research Award, *University of Pennsylvania* **2021**

Research Skills

- Characterization-
 - Spectroscopic ellipsometry, Raman/PL/Reflection spectroscopy, atomic force microscopy
- Simulation-
 - Transfer matrix method using Python (Isotropic and Anisotropic), COMSOL, Lumerical

Publications

[h-index: 15, Total citations > 800. [Google Scholar](#) *Authors contributed equally]

First and Co-First Author Publications:

1. **Lynch, J.**; Shapturenka, P.; Sadafi, M.; Liu, Z.; Ruth, T.; Jha, K.; Fakhraai, Z.; Mosallaei, H.; Engheta, N.; Fagan, J. A.; Jariwala, D. Electrically Tunable Excitonic-Hyperbolicity in Chirality-Pure Carbon Nanotubes *ACS Nano* 20, 19807-19819 (2026).
2. **Lynch, J.***; Peng, T.*; Yang, J.; Conran, B. R.; Choi, B.; Chen, C. Y.; Fakhraai, Z.; McAleese, C.; Lu, Y.; Jariwala, D. High-Temperature-Resilient Hyperbolicity in a Mixed-Dimensional Superlattice *Matter* 8, 102290 (2025).
3. Peng, T.*; **Lynch, J.***; Yang, J.; Wang, Y.; Lee, X. Conran, B. R.; McAleese C.; Jariwala, D.; Lu, Y. Polariton-Mediated Ultrafast Nonlinear Energy Transfer in a van der Waals Superlattice *ACS Nano* 19, 8, 8152-8161 (2025).
4. **Lynch, J.**; Kumar, P.; Chen, C.; Trainor, N.; Kumari, S.; Peng, T.; Chen, C. Y.; Lu, Y.; Redwing, J.; Jariwala, D. Full 2π Phase Modulation using Exciton-Polaritons in a Two-Dimensional Superlattice *Device* 3, 1 (2025).

5. Anantharaman, S. B.*; **Lynch, J.***; Aleksich, M.; Stevens, C. E.; Munley, C.; Choi, B.; Shenoy, S.; Darlington, T.; Majumdar, A.; Schuck, P. J.; Hendrickson, J. R.; Hohman, J. N.; Jariwala, D. Ultrastrong Light-Matter Coupling in Two-Dimensional Metal-Organic Chalcogenolates *Nat Photonics* 19, 322-328 (2025).
6. **Lynch, J.**; Smith, E.; Alfieri, A.; Song, B.; Klein, M.; Stevens, C. E.; Chen, C. Y.; Lawrence, C. F. K.; Kagan, C. R.; Gu, H.; Liu, S.; Peng, L.; Vangala, S.; Hendrickson, J. R.; Jariwala, D. Gate-Tunable Optical Anisotropy in Wafer-Scale, Aligned Carbon Nanotube Films *Nat Photonics* 18, 1176-1184 (2024).
7. **Lynch, J.**; Guarneri, L.; Jariwala, D.; van de Groep, J.; Exciton Resonances for Atomically-Thin Optics *Journ. Appl. Phys.* 132, 091102 (2022).

Under review:

8. **Lynch, J.***; Liu, Z.*; Krylyuk, S.; Zhang, H.; Davydov, A.; Jariwala, D. Understanding Optical Anisotropy in Multilayer γ -InSe and ϵ -GaSe <https://arxiv.org/abs/2601.13961>

Other Publications

9. Campbell, M. F.*; Kumar, P.*; **Lynch, J.**; Gao, R.; Alfieri, A.; Brewer, J.; Celenza, T. J.; Azadi, M.; Kelzenberg, M. D.; Stach, E.; Raman, A. P.; Atwater, H. A.; Bargatin, I.; Jariwala, D. Experimental Demonstration of Corrugated Nanolaminate Films as Reflective Light Sails *Nat Commun* (2026). <https://doi.org/10.1038/s41467-026-73414-4>
10. Mai, T. T.; Altvater, M. A.; Labuntsov, V.; Krylyuk, S.; Davydov, A.; Susner, M. A.; Hung, N. T.; **Lynch, J.**; Jariwala, D.; Snure, M.; Saito, R.; Perebeionos, V.; Glavin, N. R.; Rao, R. Thickness-Dependent Surface Phonon Polaritons in InSe *Matter & Light* 1, 1 (2026). <https://doi.org/10.1016/j.matlit.2026.100014>
11. Jung, S. Y.; Kim, D. S.; Rhee, D.; Lee, K. W.; Cho, Y. S.; Alfieri, A. D.; **Lynch, J.**; Jariwala, D.; Cho, H. K.; Kang, J. Multiscale Hierarchically Wrinkled MoS₂ Nanosheet Films with Enhanced Photoelectrochemical Properties *Chem Eng Journ* 538, 176992 (2026). <https://doi.org/10.1016/j.cej.2026.176992>
12. Choi, B.; **Lynch, J.**; Chen, W.; Jeon, S.-J.; Cho, H.; Yang, K.; Kim, J.; Engheta, N.; Jariwala, D. Natural Hyperbolicity of Hexagonal Boron Nitride in the Deep Ultraviolet *Nat Commun* 17, 2869 (2026). <https://doi.org/10.1038/s41467-026-69536-4>
13. Azimi, A.; Barrier, J.; Barredi, A.; Bauer, T.; Bouzari, F.; Brokkelkamp, A.; Buatier de Mongeot, F.; Parson, T.; Christianen, P.; Conesa-Boj, S.; Curto, A. G.; Das, S.; Dias, B.; Epstein I.; Federova, Z.; Garcia de Abajo, F. J.; Goykhman, I.; Greten, L.; Gronqvist, J.; Guarneri, L.; Guo, Y.; Hoekstra, T.; Hu, X.; Laudert, B.; **Lynch, J.**; Meyer, S.; Munkhbat, B.; Neshev, D.; Ogienko, M.; Papadopoulos, S.; Parappurath, A.; Sangers, J.; Soubelet, P.; Soukaras, C.; Soavi, G.; Staude, I.; Sun, Z.; Tierrooij, K.-J.; Giuss Uddin, M. D.; Ustinov, A.; van der Groep, J.; van Wezel, J.; Vermeulen, N.; Wang, H.; Wang, Y.; Xiao, S.; You, B.; Zambrana-Puyalto, X. Photonics in Flatland: Challenges and Opportunities for Nanophotonics with 2D Semiconductors *npj Nanophotonics* 2, 44 (2025). <https://doi.org/10.1038/s44310-025-00092-3>
14. Alfieri, A. D.; Ruth, T.; Lim, C.; **Lynch, J.**; Jariwala, D. Effects of Self-Hybridized Exciton-Polaritons on TMDC Photovoltaics *Nano Lett* 25, 7 (2025). <https://doi.org/10.1021/acs.nanolett.5c00399>
15. Hu, Z.; Wang, S.; **Lynch, J.**; Jariwala, D. Tandem Photovoltaics from 2D Transition Metal Dichalcogenides on Silicon *ACS Photonics* 11, 11 (2024). <https://doi.org/10.1021/acsphotonics.4c00982>
16. Lin, D.; **Lynch, J.**; Wang, S.; Hu, Z.; Rai, R. K.; Zhang, H.; Chen, C.; Kumari, S.; Stach, E. A.; Davydov, A. V.; Redwing, J.; Jariwala, D. Broadband Light Harvesting from Scalable Two-Dimensional Semiconductor Multi-Heterostructures *Nano Lett* 24, 44 (2024). <https://doi.org/10.1021/acs.nanolett.4c02963>
17. Choi, B.; Jo, K.; Rahaman, R.; Alfieri, A.; **Lynch, J.**; Pribil, G. K.; Koh, H.; Stach, E. A.; Jariwala, D. Giant Optical Anisotropy in 2D Metal-Organic Chalcogenates *ACS Nano* 18, 37 (2024). <https://doi.org/10.1021/acs.nano.4c05043>
18. Syong, W.-R.; Fu, J.-H.; Kuo, Y.-H.; Chu, Y.-C.; Hakami, M.; Peng, T.-Z.; **Lynch, J.**; Jariwala, D.; Tung, V.; Lu, Y.-J. Enhanced Photogating Gain in Scalable MoS₂ Plasmonic Photodetectors via Resonant Plasmonic Metasurfaces *ACS Nano* 18, 7 (2024). <https://doi.org/10.1021/acs.nano.3c10390>
19. Anantharaman, S. B.; **Lynch, J.**; Stevens, C. E.; Munley, C.; Li, C.; Hou, J.; Zhang, H.; Torma, A.; Darlington, T.; Coen, F.; Li, K.; Majumdar, A.; Schuck, P. J.; Mohite, A.; Harutyunyan, H.; Hendrickson, J. R.; Jariwala, D. Dynamics of Self-Hybridized Exciton-Polaritons in 2D Halide Perovskites *Light: Sci & Appl* 13, 1 (2024). <https://doi.org/10.1038/s41377-023-01334-9>

20. Song, S.; Jeon, S.; Rahaman, M.; **Lynch, J.**; Rhee, D.; Kumar, P.; Chakravarthi, S.; Kim, G.; Du, X.; Blanton, E. W.; Kisslinger, K.; Snure, M.; Glavin, N. R.; Stach, E. A.; Olsson, R. H.; Jariwala, D. Wafer-Scale Growth of Two-Dimensional, Phase-Pure InSe *Matter* 6, 10 (2023). <https://doi.org/10.1016/j.matt.2023.07.012>
21. Yuan, R.; **Lynch, J.**; Jariwala, D. Ultra-Compact Plexcitonic Electro-Absorption Modulator *Device* 1, 2 (2023). <https://doi.org/10.1016/j.device.2023.100002>
22. Song, S.; Yoon, A.; Jang, S.; **Lynch, J.**; Yang, J.; Han, J.; Choe, M.; Jin, Y. H.; Chen, C. Y.; Cheon, Y.; Kwak, J.; Jeong, C.; Cheong, H.; Jariwala, D.; Lee, Z.; Kwon, S.-Y. Fabrication of p-type 2D Single-Crystalline Transistor Arrays with Fermi-Level-Tuned van der Waals Semimetal Electrodes *Nat Commun* 14, 1 (2023). <https://doi.org/10.1038/s41467-023-40448-x>
23. Liu, B.; **Lynch, J.**; Zhao, H.; Conran, B. R.; McAleese, C.; Jariwala, D.; Forrest, S. R. Long-Range Propagation of Exciton-Polaritons in Large-Area 2D Semiconductor Monolayers *ACS Nano* 17, 15 (2023). <https://doi.org/10.1021/acsnano.3c03485>
24. Hu, Z.; Lin, D.; **Lynch, J.**; Xu, K.; Jariwala, D. How Good Can 2D Excitonic Solar Cells Be? *Device* 1, 1 (2023). <https://doi.org/10.1016/j.device.2023.100003>
25. Motala, M. J.; Zhang, X.; Kumar, P.; Oliveira, E. F.; Benton, A.; Miesle, P.; Rao, R.; Stevenson, P. R.; Moore, D.; Alfieri, A.; **Lynch, J.**; Austin, D.; Post, S.; Gao, G.; Ma, S.; Zhu, H.; Wang, Z.; Petrov, I.; Stach, E. A.; Kennedy, W. J.; Vangala, S.; Tour, J. M.; Galvao, D. S.; Jariwala, D.; Muratore, C.; Snure, M.; Ajayan, P. M.; Glavin, N. R. Synthesis of Two-Dimensional van der Waals Superlattices, Heterostructures, and Alloys from Conversion of Sequentially Layered Sub-Nanometer Metal Films *Mater Today Nano* 22, 100319 (2023). <https://doi.org/10.1016/j.mtnano.2023.100319>
26. Jo, K.; Marino, E.; **Lynch, J.**; Jiang, Z.; Gogotsi, N.; Darlington, T. P.; Soroush, M.; Schuck, P. J.; Borys, N. J.; Murray, C. B.; Jariwala, D. Direct Nano-Imaging of Light-Matter Interactions in Nanoscale Excitonic Emitters *Nat Commun* 14, 1 (2023). <https://doi.org/10.1038/s41467-023-38189-y>
27. Alfieri, A. D.; Motala, M. J.; Snure, M.; **Lynch, J.**; Kumar, P.; Zhang, H.; Post, S.; Bown, T.; Muratore, C.; Robinson, J. A.; Hendrickson, J. R.; Glavin, N. R.; Jariwala, D. Ultrathin Broadband Metasurface Superabsorbers from a van der Waals Semimetal *Adv Opt Mater* 11, 4 (2023). <https://doi.org/10.1002/adom.202202011>
28. Singh, A.; **Lynch, J.**; Anantharaman, S. B.; Hou, J.; Singh, S.; Kim, G.; Mohite, A. D.; Singh, R.; Jariwala, D. Cavity-Enhanced Raman Scattering from 2D Hybrid Perovskites (2022). <https://doi.org/10.1021/acs.jpcc.2c01577>
29. Motala, M.; Beagle, L. K.; **Lynch, J.**; Moore, D. C.; Stevenson, P. R.; Benton, A.; Tran, L. D.; Baldwin, L. A.; Austin, D.; Muratore, C.; Jariwala, D.; Glavin, N. R. Selective Vapor Sensors with Thin-Film MoS₂-Coated Optical Fibers *Journ of Vac Sci & Techno A* 40, 3 (2022). <https://doi.org/10.1116/6.0001759>
30. Kim K.-H.; Andreev, M.; Choi, S.; Shim, J.; Ahn, H.; **Lynch, J.**; Lee, T.; Lee, J.; Nazif, K. N.; Kumar, A.; Kumar, P.; Choo, H.; Jariwala, D.; Saraswat, K. C.; Park, J.-H. High-Efficiency WSe₂ Photovoltaic Devices with Electron-Selective Contacts *ACS Nano* 16, 6 (2022). <https://doi.org/10.1021/acsnano.1c10054>
31. Kumar, P.; **Lynch, J.**; Song, B.; Ling, H.; Barrera, F. Kisslinger, K.; Zhang, H.; Anantharaman, S. B.; Digani, J.; Zhu, H.; Choudhury, T. H.; McAleese, C.; Wang, X.; Conran, B. R.; Whear, O.; Motala, M. J.; Snure, M.; Muratore, C.; Redwing, J. M.; Glavin, N. R.; Stach, E. A.; Davoyan, A. R.; Jariwala, D. Light-Matter Coupling in Large-Area van der Waals Superlattices *Nat Nano* 17, 2 (2022). <https://doi.org/10.1038/s41565-021-01023-x>
32. Anantharaman, S. B.; Stevens, C. E.; **Lynch, J.**; Song, B.; Hou, J.; Zhang, H.; Jo, K.; Kumar, P.; Blancon, J.-C.; Mohite, A. D.; Hendrickson, J. R.; Jariwala, D. Slef-Hybridized Polaritonic Emission form Layered Perovskites *Nano Lett* 21, 14 (2021). <https://doi.org/10.1021/acs.nanolett.1c02058>

Patents

1. Jariwala, D.; **Lynch, J.**; Kumar, P.; Barrera, F.; Davoyan, A. Scalable Van Der Waals Superlattices for Absorbers and Emitters