

## Curriculum Vitae

Notarization. I have read the following and certify that this *curriculum vitae* is a current and accurate statement of my professional record.

Aaron Sternbach

08/07/2023

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**I. Personal Information**

I.A. Sternbach, Aaron, James,  
*ajs01123@umd.edu*

I.B. Academic Appointments at UMD  
*Assistant professor: Starting on January 2024*

I.C. Professional appointments

Graduate Research Assistant	University of California, San Diego	2013-2017
Graduate Research Assistant	Columbia University	2017-2020
Postdoctoral Fellow	Columbia University	2020-2023

I.D. Educational Background

Boston University (PI: Richard Averitt)	Physics	BS	2013
Columbia University: (PI: Dmitri Basov)	Physics	Ph.D	2020

I.E. Professional Certifications, Licenses, and Memberships

**II. Research, Scholarly, Creative and/or Professional Activities**

II.A. Conferences, Workshops, and Talks

II.A.1. Invited Talks

Inaugural workshop of Boron Nitride, Montpellier, France (2023)  
Photonics West, San Francisco, CA (2023)  
The Betty and Gordon Moore Foundation EPiQS postdoc Symposium, Beverly, MA (2022)  
TSRC workshop on Spatiotemporal dynamics of Excitons, Telluride, CO (2022)  
MRS Fall meeting, Boston, MA (2021)  
APS-MAS regional meeting, New Brunswick, NJ (2021)  
QUOROM-5, virtual international conference, online (2021)  
Seminar at Hong Kong University of Science and Technology, HKUST, online (2021)  
TSRC workshop on Spatiotemporal dynamics of Excitons, online (2021)  
SPIE Photonics west Digital Forum, online (2021)  
Materials Research Science and Engineering centers IRG2 webinar, online (2021)  
The Betty and Gordon Moore Foundation EPiQS postdoc Symposium, online (2021)  
Ultrafast Webinar Summer Series, online (2020)  
SPIE Ultrafast Bandgap Photonics III, Orlando, FL (2018)  
SPIE Ultrafast Bandgap Photonics I, Baltimore, MA (2016)

II.B. Professional and Extension Publications

FIRST AND EQUALLY CONTRIBUTING AUTHORSHIP

1. **A. J. Sternbach**, R. A. Vitalone, S. Shabani, J. Zhang, T. P. Darlington, S. L. Moore, S. H. Chae, E. Seewald, X. Xu, C. R. Dean, X. Y. Zhu, A. Rubio, J. Hone, A. N. Pasupathy, P. J. Schuck *Nano Letters*, **23**, 5070-5075 (2023)
2. **A. J. Sternbach**, S. Moore, A. Rikhter, S. Zhang, R. Jing, Y. Shao, B. Kim, S. Xu, S. Liu, J. H. Edgar, A. Rubio, C. Dean, J. Hone, M. M. Fogler, D. N. Basov, Negative refraction in hyperbolic hetero-bicrystals. *Science*, **379**, 555-557 (2023)
3. B. Kim\*, **A. J. Sternbach\***, M. S. Choi\*, Z. Sun, F. L. Ruta, Y. Shao, A. S. McLeod, L. Xiong, Y. Dong, A. Rajendran, S. Liu, A. Nipane, S. Chae, A. Zangiabadi, X. Xu, A. J. Millis, P. J. Schuck, C. Dean, J. C. Hone, D. N. Basov, Atomically imprinted graphene plasmonic cavities, *In press*, *Nature Materials*, **22**, 838-843 (2023)
4. **A. J. Sternbach**, F. L. Ruta, Y. Shi, T. Slusar, J. Schalch, G. Duan, A. S. McLeod, X. Zhang, M. K. Liu, A. J. Millis, H.-T. Kim, L.-Q. Chen, R. D. Averitt, D. N. Basov, Nanotextured Dynamics of a Light-Induced Phase Transition in VO<sub>2</sub>. *Nano Letters* **21**, 9052-9060 (2021).
5. **A. J. Sternbach**, S. H. Chae, S. Latini, A. A. Rikhter, Y. Shao, B. Li, D. Rhodes, B. Kim, P. J. Schuck, X. Xu, X.-Y. Zhu, R. D. Averitt, J. Hone, M. M. Fogler, A. Rubio, D. N. Basov, Programable Hyperbolic Polaritons in van der Waals Semiconductors. *Science* **371**, 617-620 (2021).
6. **A. J. Sternbach**, S. Latini, S. Chae, H. Hübener, U. De Giovannini, Y. Shao, L. Xiong, Z. Sun, N. Shi, P. Kissin, G.-X. Ni, D. Rhodes, B. Kim, N. Yu, A. J. Millis, M. M. Fogler, P. J. Schuck, M. Lipson, X.-Y. Zhu, J. Hone, R. D. Averitt, A. Rubio, D. N. Basov, Femtosecond exciton dynamics in WSe<sub>2</sub> optical waveguides. *Nature Communications* **11**, 1-6 (2020)
7. **A. J. Sternbach**, J. Hinton, T. Slusar, A. S. McLeod, M. K. Liu, A. Frenzel, M. Wagner, R. Iraheta, F. Keilmann, A. Leitenstorfer, M. M. Fogler, H.-T. Kim, R. D. Averitt, D. N. Basov, Artifact free time resolved near-field spectroscopy. *Opt. Express* **25**, 28589-28611 (2017).

#### SECOND AUTHOR

8. R.A. Vitalone, **A. J. Sternbach**, B. A. Foutty, A. S. McLeod, C. Sow, D. Golez, F. Nakamura, Y. Maeno, A. N. Pasupathy, A. Georges, A. J. Millis, D. N. Basov, Nanoscale Femtosecond Dynamics of Mott Insulator (Ca<sub>0.99</sub>Sr<sub>0.01</sub>)<sub>2</sub>RuO<sub>4</sub>, *Nano Letters* **22**, 5689 (2022)
9. Y. Shao, **A. J. Sternbach**, B. Kim, A. A. Rikhter, X. Xu, U. De Giovannini, R. Jing, S. H. Chae, Z. Sun, S. H. Lee, Y. Zhu, M. Mao, J. Hone, R. Queiroz, A. J. Millis, P. J. Schuck, A. Rubio, M. M. Fogler, D. N. Basov, Hyperbolic Plasmons Propagate through a Nodal Metal, *Science Advances* **8**, eadd6169 (2022)
10. F. L. Ruta, **A. J. Sternbach**, A. B. Dieng, A. S. McLeod, D. N. Basov, Quantitative nanoinfrared spectroscopy of anisotropic van der Waals materials. *Nano Letters* **20**, 7933-7940 (2020)
11. A. Charnukha, **A. J. Sternbach**, H. T. Stinson, R. Schlereth, C. Brüne, L. W. Molenkamp, D. N. Basov, Ultrafast nonlocal collective dynamics of Kane plasmon-polaritons in a narrow-gap semiconductor. *Science Advances* **5**, eaau 9956 (2019)
12. H. T. Stinson, **A. J. Sternbach**, O. Narjera, R. Jing, A. S. McLeod, T. V. Slusar, A. Mueller, L. Anderegg, H.-T. Kim, M. Rozenberg, D. N. Basov, Imaging the nanoscale phase separation in vanadium dioxide thin films at terahertz frequencies. *Nature Communications* **9**, 1-9 (2018)
13. M. Liu, **A. J. Sternbach**, D. N. Basov, Nanoscale electrostatics of strongly correlated quantum materials. *Reports on Progress in Physics* **80**, 014501 (2016)
14. M. Liu, **A. J. Sternbach**, M. Wagner, T. V. Slusar, T. Kong, S. L. Bud'ko, S. Kittiwatanakul, M. M. Qazilbash, A. S. McLeod, Z. Fei, E. Abreu, J. Zhang, M. Goldflam, S. Dai, G.-X. Ni, J. Lu, H. A. Bechtel, M. C. Martin, M. B. Raschke, R. D. Averitt, S. A. Wolf, H.-T. Kim, P. C. Canfield, D. N. Basov, Phase transition in bulk single crystals and thin films of VO<sub>2</sub> by nanoscale infrared spectroscopy and imaging. *Physical Review B* **91**, 245155 (2015)

15. X. Deng, **A. J. Sternbach**, K. Haule, D. N. Basov, G. Kotliar, Shining light on transition-metal oxides: unveiling the hidden fermi liquid. *Physical Review Letters* **113**, 246404 (2014)

#### CONTRIBUTING AUTHORSHIP

16. F. Mooshammer, S. Chae, S. Zhang, Y. Shao, S. Qiu, A. Rajendran, **A. J. Sternbach**, D. J. Rizzo, X.-Y. Zhu, P. J. Schuck, J. C. Hone, D. N. Basov, In-Plane Anisotropy in Biaxial ReS<sub>2</sub> Crystals Probed by Nano-Optical Imaging of Waveguide Modes. *ACS Photonics* **8** 443-451 (2022)
17. S. Zhang, B. Li, X. Chen, F. L. Ruta, Y. Shao, **A. J. Sternbach**, A. S. McLeod, Z. Sun, L. Xiong, Z. Wang, F. Mooshammer, E. Ray, N. Wilson, P. J. Schuck, C. R. Dean, A. N. Pasupathy, M. Lipson, X. Xu, X.-Y. Zhu, A. J. Millis, M. K. Liu, J. C. Hone, D. N. Basov, *Nature Communications* **13**, 542 (2022)
18. S. L. Moore, C. J. Ciccarino, D. Halbertal, L. J. McGilly, N. R. Finney, K. Yao, Y. Shao, G. Ni, **A. J. Sternbach**, E. J. Telford, B. Kim, S. E. Rossi, K. Wantanabe, T. Taniguchi, A. N. Pasupathy, C. R. Dean, J. Hone, P. J. Schuck, P. Narang, D. N. Basov, Nanoscale lattice dynamics in hexagonal boron nitride more superlattices. *Nature Communications* **12**, 5741 (2021)
19. G. X. Ni, S. Chen, S. S. Sunku, **A. J. Sternbach**, A. S. McLeod, L. Xiong, M. M. Fogler, G. Chen, D. N. Basov, Nanoscale Infrared Spectroscopy and Imaging of Catalytic Reactions in Cu<sub>2</sub>O crystals. *ACS Photonics* **7**, 576-580 (2020)
20. S. S. Sunku, A.S. McLeod, T. Stauber, H. Yoo, D. Halbertal, G. X. Ni, **A. J. Sternbach**, B.-Y. Jiang, T. Taniguchi, K. Watanabe, P. Kim, M. M. Fogler, D. N. Basov, Nano-photocurrent mapping of local electronic structure in twisted bilayer graphene. *Nano Letters* **20**, 2958-2964 (2020)
21. L. Xiong, C. Forsythe, M. Jung, A. S. McLeod, S. S. Sunku, Y. M. Shao, G. X. Ni, **A. J. Sternbach**, S. Liu, J. H. Edgar, E. J. Mele, M. M. Fogler, G. Shvets, C. R. Dean, D. N. Basov, Photonic crystal for graphene plasmons. *Nature Communications* **10**, 4780 (2019)
22. S. S. Sunku, G.X. Ni, B. Y. Jiang, H. Yoo, **A. J. Sternbach**, A. S. McLeod, T. Stauber, L. Xiong, T. Taniguchi, K. Watanabe, P. Kim, M. M. Fogler, D. N. Basov, Photonic crystals for nano-light in moire graphene superlattices. *Science* **362**, 1153-1156 (2018)
23. A. X. Gray, M. C. Hoffmann, J. Jeong, N. P. Aetukuri, D. Zhu, H. Y. Hwang, N. C. Brandt, H. Wen, **A. J. Sternbach**, S. Bonetti, A. H. Reid, R. Kukreja, C. Graves, T. Wang, P. Granitzka, Z. Chen, D. J. Higley, T. Chase, E. Jal, E. Abreu, M. K. Liu, T.-C. Weng, D. Sokaras, D. Nordlund, M. Chollet, R. Alonso-Mori, H. Lemke, J. M. Glowia, M. Trigo, Y. Zhu, H. Ohldag, J. W. Freeland, M. G. Samant, J. Berakdar, R. D. Averitt, K. A. Nelson, S. Parkin, H. A. Dürr, Ultrafast field control of electronic and structural interactions in vanadium dioxide. *Physical Review B* **98**, 045104 (2018)
24. H. Y. Hwang, S. Fleischer, N. C. Brandt, B. G. Perkins Jr, M. Liu, K. Fan, **A. J. Sternbach**, X. Zhang, R. D. Averitt, K. A. Nelson, A review or non-linear terahertz spectroscopy with ultrashort tabletop-laser pulses. *Journal of Modern Optics* **62**, 1447-1479 (2015)
25. M. D. Goldflam, M. K. Liu, B. C. Chapler, H. T. Stinson, **A. J. Sternbach**, A. S. McLeod, J. D. Zhang, K. Geng, M. Royal, B.-Jun. Kim, R. D. Averitt, N. M. Jokerst, D. R. Smith, H.-T. Kim, D. N. Basov, Voltage switching of a VO<sub>2</sub> memory metasurface using ionic gel. *Applied Physics Letters* **105**, 041117 (2014)
26. M. Liu, M. Wagner, J. Zhang, A. S. McLeod, S. Kittiwatanakul, Z. Fei, E. Abreu, M. Goldflam, **A. J. Sternbach**, S. Dai, K. G. West, J. Lu, S. A. Wolf, R. D. Averitt, D. N. Basov, Symmetry breaking and geometric confinement in VO<sub>2</sub>: Results from a three-dimensional infrared nano-imaging. *Applied Physics Letters*, **104**, 121905 (2014)
27. K. Fan, H.Y. Hwang, M. Liu, A. C. Strikwerda, **A. J. Sternbach**, J. Zhang, X. Zhao, X. Zhang, K. A. Nelson, R. D. Averitt, Nonlinear terahertz metamaterials via field-enhanced carrier dynamics in GaAs. *Physical Review Letters* **110**, 217404 (2013)

28. M. Liu, H. Y. Hwang, H. Tao, A. C. Strikwerda, K. Fan, G. R. Keiser, **A. J. Sternbach**, K. G. West, S. Kittiwatanakul, J. Lu, S. A. Wolf, F. G. Omenetto, X. Zhang, K. A. Nelson, R. D. Averitt, Terahertz-field induced insulator-to-metal transition in vanadium dioxide metamaterial. *Nature* **487**, 345-348 (2012)