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EDUCATION

PhD (Electrical Engineering)	Princeton University	2005
MA (Electrical Engineering)	Princeton University	2001
BE (Electronic Engineering)	Tsinghua University	1998

EXPERIENCE

Associate Professor with Tenure	Yale University	2019 -
Assistant & Associate Professor on Term	Yale University	2013 - 2019
Postdoc, Engineer & Research Staff	IBM Research	2005 - 2013

RESEARCH INTERESTS

Quantum geometry and band topology of emerging materials; Intelligent sensing enabled by deep learning and reconfigurable devices; Infrared imaging and sensing devices; Nonconventional synthesis of emerging quantum materials

SELECTED AWARDS AND HONORS

2021: Elected Optica Fellow (formerly Fellow of Optical Society of America)
2019: Presidential Early Career Award for Scientists and Engineers (PECASE)
2017-2021: Highly Cited Researcher, Clarivate Analytics
2016: National Science Foundation CAREER Award
2015: Barton L. Weller Endowed Professorship, Yale University
2015: Office of Naval Research Young Investigator Program Awardee
2012: IBM Corporate Award (the highest award that IBM grants to its employees)
2011: TR35, MIT Technology Review's Top Young Innovators under 35
1998: Graduation with the Highest Honor, Tsinghua University, Beijing, China

PROFESSIONAL ACTIVITIES & SERVICES

Editorial Board: Nano Research (Springer and Tsinghua University); Advanced Optical Materials (Wiley); 2D Materials (IoP); npj 2D Materials and Applications (Nature Partner Journal)
Associate Editor: Science Advances (AAAS)
Primary Guest Editor: IEEE Journal of Selected Topics of Quantum Electronics (2017)
Guest Editor: IEEE Journal of Selected Topics of Quantum Electronics (2014&2022)
Conference Organization: Committee Member, IEDM 2014
Conference Co-chairs: IEEE Summer Topicals Meeting 2014; OSA Incubator Meeting on Nanophotonic Devices 2014; International 2D Material Conference 2015 & 2016
Membership: IEEE; America Physical Society; Optica
***Journal Review*:** Science; Science Advances; Nature; Nature Nanotechnology; Nature Physics; Nature Materials; Nature Photonics; Nature Communications; Physical Review Letters; Physical Review X; Physical Review B; ACS Nano; Nano Letters; Journal of American Chemical Society; Small, Nanoscale, Applied Physics Letters; AIP Advance; Advanced Materials; Advanced Functional Materials; Advanced Optical Materials; 2D Materials; Optics Letters; Optics Express;

Proceedings of the IEEE; IEEE Photonics Technology Letters; IEEE Journal of Lightwave Technology; IEEE Journal of Quantum Electronics; IEEE Transactions on Electronic Device; IEEE Electronic Device Letters, etc.
Grant Review: National Science Foundation; Department of Energy; Air Force Office of Scientific Research; Army Research Office; German-Israel Foundation; German Research Foundation; Marie-Curie Actions; Israel Ministry of Science; Israel Science Foundation; Netherlands Organization for Scientific Research; ACS Petroleum Fund; European Commission Flagship Projects; European Research Council; Natural Sciences and Engineering Research Council of Canada; French National Research Agency; Singapore Ministry of Education; Hong Kong Research Grants Council; FWF Austrian Science Fund; Swiss National Science Foundation; Belgium Fund for Scientific Research-FNRS; Private Foundations in US, Europe and Asia.

SELECTED JOURNAL PUBLICATIONS

1. M. Fortin-Deschênes and **F. Xia**, "A tale of two dimensionalities," ***Nature Materials*** 21, 735-736 (2022). (News & Views)
2. C. Ma, S. Yuan, P. Cheung, K. Watanabe, T. Taniguchi, F. Zhang, and **F. Xia**, "Intelligent infrared sensing enabled by tunable moiré quantum geometry," ***Nature*** 604, 266-272 (2022).
3. S. Yuan, D. Naveh, K. Watanabe, T. Taniguchi, and **F. Xia**, "A wavelength-scale black phosphorus spectrometer," ***Nature Photonics*** 15, 601-607 (2021).
4. B. Deng, C. Ma, Q. Wang, S. Yuan, K. Watanabe, T. Taniguchi, F. Zhang, and **F. Xia**, "Strong mid-infrared photoresponse in small-twist-angle bilayer graphene," ***Nature Photonics*** 14, 549-553 (2020).
5. C. Chen, X. Lu, B. Deng, X. Chen, Q. Guo, C. Li, C. Ma, S. Yuan, E. Sung, K. Watanabe, T. Taniguchi, L. Yang, and **F. Xia**, "Widely tunable mid-infrared light emission in thin-film black phosphorus," ***Science Advances*** 6, eaay6134 (2020).
6. J. Liu, **F. Xia**, D. Xiao, F. J. García de Abajo, and D. Sun, "Semimetals for high-performance photodetection," ***Nature Materials*** 19, 830-837 (2020).
7. C. Ma, Q. Wang, S. Mills, X. Chen, B. Deng, S. Yuan, C. Li, K. Watanabe, T. Taniguchi, D. Xu, F. Zhang, and **F. Xia**, "Moiré band topology in twisted bilayer graphene," ***Nano Letters*** 20, 6076-6083 (2020).
8. **F. Xia**, H. Wang, J. C. M. Hwang, A. H. Castro Neto, and L. Yang "Black phosphorus and its isoelectronic materials," ***Nature Reviews Physics*** 1, 306–317 (2019).
9. Q. Guo, R. Yu, C. Li, S. Yuan, B. Deng, F. J. García de Abajo, and **F. Xia**, "Efficient electrical detection of mid-infrared graphene plasmons at room temperature," ***Nature Materials*** 17, 986-992 (2018).
10. R. Yu, Q. Guo, **F. Xia**, and F. J. García de Abajo, "Photothermal engineering of graphene plasmons," ***Physical Review Letters*** 121, 057404 (2018).
11. X. Chen, X. Lu, B. Deng, O. Sinai, Y. Shao, C. Li, S. Yuan, V. Tran, K. Watanabe, T. Taniguchi, D. Naveh, L. Yang, and **F. Xia**, "Widely tunable black phosphorus mid-infrared photodetector," ***Nature Communications*** 8, 1672 (2017).
12. Z. Xia, H. Song, M. Kim, M. Zhou, T.-H. Chang, D. Liu, X. Yin, K. Xiong, H. Mi, X. Wang, **F. Xia**, Z. Yu, Z. Ma, and Q. Gan, "Single-crystalline germanium nanomembrane photodetectors on foreign nanocavities," ***Science Advances*** 3, e1602783 (2017).

13. B. Deng, V. Tran, Y. Xie, H. Jiang, C. Li, Q. Guo, X. Wang, H. Tian, S. J. Koester, H. Wang, J. J. Cha, Q. Xia, L. Yang, and **F. Xia**, "Efficient electrical control of thin-film black phosphorus bandgap," ***Nature Communications*** 8, 14474 (2017).
14. Q. Guo, A. Pospischil, M. Bhuiyan, H. Jiang, H. Tian, D. Farmer, B. Deng, C. Li, S.-J. Han, H. Wang, Q. Xia, T.-P. Ma, T. Mueller, and **F. Xia**, "Black phosphorus mid-infrared photodetectors with high gain," ***Nano Letters*** 16, 4648–4655 (2016).
15. **F. Xia**, "Flat talk," ***Nature Photonics*** 10, 205-206 (2016). (***Interview***)
16. X. Ling, H. Wang, S. Huang, **F. Xia**, and M. S. Dresselhaus, "The renaissance of black phosphorus," ***Proceedings of the National Academy of Sciences*** 112, 4523-4530 (2015).
17. X. Wang, A. M. Jones, K. L. Seyler, V. Tran, Y. Jia, H. Zhao, H. Wang, L. Yang, X. Xu, and **F. Xia**, "Highly anisotropic and robust excitons in monolayer black phosphorus," ***Nature Nanotechnology*** 10, 517-521 (2015).
18. X. Wang, and **F. Xia**, "van der Waals heterostructures: Stacked 2D materials shed light," ***Nature Materials*** 14, 264-265 (2015). (**News & Views**)
19. X. Liu, T. Galfsky, Z. Sun, **F. Xia**, E. Lin, Y.-H. Lee, S. Kéna-Cohen, and V. Menon. "Strong light–matter coupling in two-dimensional atomic crystals," ***Nature Photonics*** 9, 30-34 (2015).
20. **F. Xia**, H. Wang, D. Xiao, M. Dubey, and A. Ramasubramaniam, "Two-dimensional material nanophotonics," ***Nature Photonics*** 8, 899-907 (2014).
21. T. Low, R. Roldan, H. Wang, **F. Xia**, P. Avouris, L. Moreno, and F. Guinea, "Plasmons and screening in monolayer and multilayer black phosphorus," ***Physical Review Letters***, 113, 106802 (2014).
22. **F. Xia**, "Electrons en masse," ***Nature Nanotechnology*** 9, 575-576 (2014). (**News & Views**)
23. T. Low, F. Guinea, H. Yan, **F. Xia**, and P. Avouris, "Novel midinfrared plasmonic properties of bilayer graphene," ***Physical Review Letters*** 112, 116801 (2014).
24. **F. Xia**, H. Wang, and Y. Jia, "Rediscovering black phosphorus as an anisotropic layered material for optoelectronics and electronics," ***Nature Communications*** 5, 4458 (2014).
25. W. Zhu, T. Low, Y.-H. Lee, H. Wang, D. Farmer, J. Kong, **F. Xia**, and P. Avouris, "Electronic transport and device prospects of monolayer molybdenum disulphide grown by chemical vapor deposition," ***Nature Communications*** 5, 3087 (2014).
26. **F. Xia**, H. Yan, and P. Avouris, "The interaction of light and graphene: physics and applications," ***Proceedings of the IEEE*** 101, 1717-1731 (2013).
27. M. Freitag, T. Low, W. Zhu, H. Yan, **F. Xia**, and P. Avouris, "Photocurrent in graphene harnessed by tunable intrinsic plasmons," ***Nature Communications***, 4 1951 (2013).
28. H. Yan, T. Low, W. Zhu, Y. Wu, M. Freitag, X. Li, F. Guinea, P. Avouris, and **F. Xia**, "Damping pathways of mid-infrared plasmons in graphene nanostructures," ***Nature Photonics*** 7, 394-399 (2013). *Highlighted by interview with F. Xia, "Graphene versus metal plasmons," Nature Photonics 7, 420 (2013)*.
29. M. Freitag, T. Low, **F. Xia**, and P. Avouris, "Photoconductivity of biased graphene," ***Nature Photonics*** 1, 53-59 (2013).
30. H. Yan, X. Li, B. Chandra, G. Tulevski, Y. Wu, M. Freitag, W. Zhu, P. Avouris, and **F. Xia**, "Tunable infrared plasmonic devices using graphene/insulator stacks," ***Nature Nanotechnology*** 7, 330-334 (2012).
31. Y. Wu, Y. Lin, A. Bol, K. Jenkins, **F. Xia**, D. Farmer, Y. Zhu, and P. Avouris, "High-frequency, scaled graphene transistors on diamond-like carbon," ***Nature*** 472, 74-78 (2011).

32. **F. Xia**, V. Perebeinos, Y. Lin, Y. Wu, and P. Avouris, "The origins and limits of metal-graphene junction resistance," ***Nature Nanotechnology*** 6, 179-184 (2011).
33. T. Mueller, **F. Xia**, and P. Avouris, "Graphene photodetectors for high-speed optical communications," ***Nature Photonics*** 4, 297-301 (2010).
34. S. Assefa, **F. Xia**, and Y. Vlasov, "Reinventing germanium avalanche photodetector for on-chip optical interconnects," ***Nature*** 464, 80-84 (2010).
35. **F. Xia**, D. Farmer, Y. Lin, and P. Avouris, "Graphene field-effect-transistors with high on/off current ratio and large transport bandgap at room temperature," ***Nano Letters*** 10, 715-718 (2010).
36. **F. Xia**, T. Muller, Y. Lin, A. Valdes-Garcia, and P. Avouris, "Ultrafast graphene photodetector," ***Nature Nanotechnology*** 4, 839-843 (2009).
37. **F. Xia,** M. Steiner, Y. Lin, and P. Avouris, "A microcavity-controlled, current-driven nanotube emitter at infrared wavelengths," ***Nature Nanotechnology*** 3, 609-613 (2008).
38. Y. Vlasov, W. M. Green, and **F. Xia**, "High-throughput silicon nanophotonic wavelength-insensitive switch for on-chip optical networks," ***Nature Photonics*** 2, 242-246 (2008).
39. **F. Xia**, L. Sekaric, and Y. Vlasov, "Ultra-compact optical buffers on a silicon chip," ***Nature Photonics*** 1, 65-71 (2007). *Highlighted by the journal cover and interview with F. Xia and Y. Vlasov, "Slower light, faster computer" Nature Photonics 1, 72 (2007).*
40. **F. Xia**, S. Datta, and S. Forrest, "A monolithically integrated optical heterodyne receiver," ***IEEE Photonics Technology Letters*** 17, 1716-1718 (2005).
41. **F. Xia**, V. Menon, and S. Forrest, "Photonic integration using asymmetric twin-waveguide (ATG) technology (I): concepts and theory," ***IEEE Journal of Selected Topics in Quantum Electronics*** 11, 17-29 (2005).
42. **F. Xia**, J. K. Thomson, M. R. Gokhale, P. V. Studenkov, J. Wei, W. Lin, and S. Forrest, "An asymmetric twin-waveguide high-bandwidth photodiode using a lateral taper coupler," ***IEEE Photonics Technology Letters*** 13, 845-847 (2001).

SELECTED AWARDED PATENTS IN USPTO (with co-inventors)

	Patent Number	*Patent Title*
1	10,636,654	Wafer-scale synthesis of large-area black phosphorus material heterostructures
2	8,541,734	Avalanche impact ionization amplification devices
3	8,395,103	Avalanche impact ionization amplification devices
4	8,378,465	Method and apparatus for optical modulation
5	8,232,516	Avalanche impact ionization amplification devices
6	8,139,904	Method and apparatus for implementing optical deflection switching using coupled resonators
7	8,053,782	Single and few-layer graphene based photodetecting devices
8	7,999,344	Optoelectronic device with germanium photodetector
9	7,880,201	Optical modulator using a serpentine dielectric layer between silicon layers
10	7,790,495	Optoelectronic device with germanium photodetector
11	7,684,666	Method and apparatus for tuning an optical delay line
12	7,515,793	Waveguide photodetector
13	7,373,048	Polarization insensitive semiconductor optical amplifier

14	7,333,689	Photonic integrated devices having reduced absorption loss
15	6,795,622	Photonic integrated circuits