

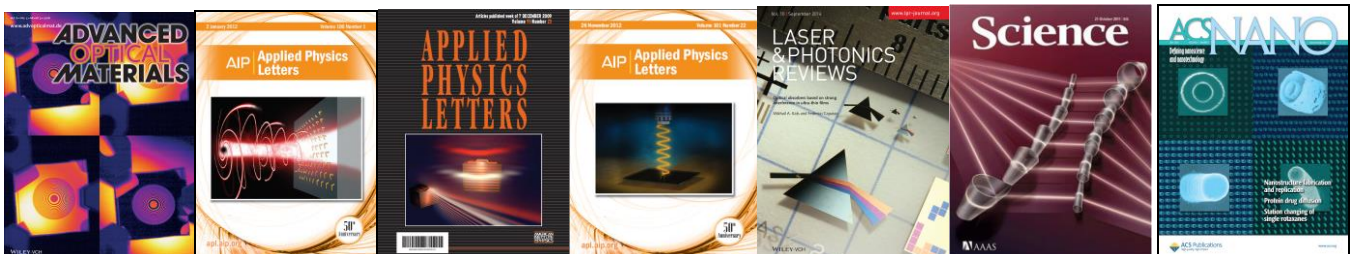
Mikhail A. Kats

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EDUCATION	Harvard University PhD in Applied Physics (Advisor: Federico Capasso) SM in Applied Physics	Cambridge, MA February 2014 May 2010
	Cornell University BS in Engineering Physics, with Honors	Ithaca, NY May 2008
POSITIONS	University of Wisconsin - Madison Assistant Professor, Dugald C. Jackson Faculty Scholar <u>Electrical and Computer Engineering</u> (primary) Materials Science and Engineering Physics McPherson Eye Research Institute Wisconsin Energy Institute	Madison, WI January 2015 – present April 2015 – present April 2016 – present September 2016 – present June 2017 – present
	Harvard University Postdoctoral Fellow	Cambridge, MA February 2014 – January 2015
AWARDS	Dugald C. Jackson Faculty Scholar (2018) ASEE Prism “20 Under 40” (2018) National Science Foundation (NSF) CAREER Award (2018) Coatings Young Investigator Award (2018) Air Force Office of Scientific Research (AFOSR) Young Investigator (2017) Office of Naval Research (ONR) Young Investigator (2016) Forbes “30 under 30” in Science (2016) Optical Society of America (OSA) Traveling Lecturer (2016 - 2017) Grainger Faculty Scholar (2015) Harvard Graduate Society Merit Fellowship (2013) NSF Graduate Research Fellowship (2010 - 2013)	

JOURNAL COVERS



JOURNAL PUBLICATIONS [Total citations >9,100; h-index \geq 32, tracked by Google Scholar]

[61] Z. Yu, C. Wan, J. Salman, B. S. Gundlach, Y. Xiao, Z. Yu, M. A. Kats, “Multi-refractive-index metamaterials based on subwavelength waveguide arrays”, *Arxiv:1807.11603* (2018)

- [60] Y. Xiao, A. Shahsafi, C. Wan, P. J. Roney, G. Joe, Z. Yu, J. Salman, and M. A. Kats, “Thermal-emission measurements near room temperature using Fourier-transform infrared spectroscopy”, *Arxiv*:1807.08682 (2018)
- [59] N. Antonellis, R. Thomas, M. A. Kats, I. Vitebskiy, T. Kottos, “Asymmetric Transmission in Photonic Structures with Phase-Change Components”, *Arxiv*: 1806.07514 (2018)
- [58] D. G. Baranov, Y. Xiao, I. A. Nechepurenko, A. Krasnok, A. Alù, M. A. Kats, “Nanophotonic engineering of active and functional thermal emitters”, *Arxiv*: 1806.03372 (2018)
- [57] S. Niu, G. Joe, H. Zhao, Y. Zhou, T. Orvis, H. Huyan, J. Salman, K. Mahalingam, B. Urwin, J. Wu, Y. Liu, T. Tiwald, S. B. Cronin, B. M. Howe, M. Mecklenburg, R. Haiges, D. J. Singh, H. Wang, M. A. Kats*, J. Ravichandran, “Giant optical anisotropy in a quasi-1D crystal”, *Nature Photonics* 12, 392 (2018) [*joint senior author]
- Highlighted in a *News & Views* article (*Nat. Photonics* 12, 382 (2018)), and by *Materials Today* [[link](#)]
- [56] M. Zhou, H. Song, X. Xu, A. Shahsafi, Z. Xia, Z. Ma, M. A. Kats, J. Zhu, B. S. Ooi, Q. Gan, Z. Yu, “Accelerating vapor condensation with daytime radiative cooling”, *Arxiv*:1804.10736 (2018)
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- [54] A. Shahsafi, Y. Xiao, J. Salman, B. S. Gundlach, C. Wan, P. J. Roney, and M. A. Kats, “Mid-infrared optics using dielectrics with refractive indices below unity”, *Arxiv*:1803.10152 (2018), in press in *Physical Review Applied*
- [53] Y. Sun, K. V. L. V. Narayanachari, C. Wan, X. Sun, H. Wang, K. A. Cooley, S. E. Mohny, D. White, A. Duwel, M. A. Kats, and S. Ramanathan, “Thermally tunable VO₂-SiO₂ nanocomposite thin-film capacitors”, *Journal of Applied Physics* 123, 114103 (2018)
- [52] C. Wan, E. Horak, J. King, J. Salman, Z. Zhang, Y. Zhou, P. Roney, B. Gundlach, S. Ramanathan, R. Goldsmith, and M. A. Kats, “Limiting optical diodes enabled by the phase transition of vanadium dioxide”, *ACS Photonics* 5, 2688 (2018)
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- [50] J. Salman, M. Hafermann, J. Rensberg, C. Wan, R. Wambold, B. Gundlach, C. Ronning, M. A. Kats, “Flat optical and plasmonic devices using area-selective ion-beam doping of silicon”, *Advanced Optical Materials* 1701027 (2018) [Inside Cover]
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- [42] M. Khorasaninejad, F. Aieta, P. Kanhaiya, M. A. Kats, P. Genevet, D. Rousso, and F. Capasso, “Achromatic metasurface lens at telecommunications wavelengths”, *Nano Letters* 15, 5358 (2015)

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- [40] F. Aieta, M. A. Kats, P. Genevet, and F. Capasso, “Multiwavelength achromatic metasurfaces by dispersive phase compensation”, *Science* 347, 1342 (2015)
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- [34] H. Gudjonson, M. A. Kats, K. Liu, Z. Nie, E. Kumacheva, and F. Capasso, “Accounting for inhomogeneous broadening in nano-optics by electromagnetic modeling based on Monte Carlo methods”, *Proceedings of the National Academy of Sciences* 111, E639 (2014)
- [33] F. Aieta, P. Genevet, M. A. Kats, and F. Capasso, “Aberrations of flat lenses and aplanatic metasurfaces”, *Optics Express* 21, 31530 (2013)]
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- [24] M. A. Kats, R. Blanchard, P. Genevet, J. Lin, D. Sharma, Z. Yang, M. M. Qazilbash, D. Basov, S. Ramanathan, and F. Capasso, “Thermal tuning of mid-infrared plasmonic antenna arrays using a phase change material”, *Optics Letters* 38, 368 (2013)
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- Highlighted in the *Huffington Post* [[link](#)], *Wired* [[link](#)], and *Optics and Photonics News* [[link](#)], and internationally in *Galileo* (it) and *La Recherche* (fr).
- [18] F. Aieta, P. Genevet, M. A. Kats, N. Yu, R. Blanchard, Z. Gaburro, F. Capasso, “Aberration-free ultrathin flat lenses and axicons at telecom wavelengths based on plasmonic metasurfaces”, *Nano Letters* 12, 4932 (2012)
- Highlighted in the *Economist* [[link](#)], *Wired* [[link](#)], *Daily Mail*, *Physics World*, *Laser Focus World*, *Kurzweil AI*, and dozens of other domestic and international publications
- [17] M. A. Kats, P. Genevet, G. Aoust, N. Yu, R. Blanchard, F. Aieta, Z. Gaburro, and F. Capasso, “Giant birefringence in optical antenna arrays with widely tailorable optical anisotropy”, *Proceedings of the National Academy of Sciences* 109, 12364 (2012)
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- [14] P. Genevet, N. Yu, F. Aieta, J. Lin, M. A. Kats, R. Blanchard, M. O. Scully, Z. Gaburro, F. Capasso, “Ultra-thin plasmonic optical vortex plate based on phase discontinuities”, *Applied Physics Letters* 100, 13101 (2012) [featured on journal cover]
- [13] R. Blanchard, S. V. Boriskina, P. Genevet, M. A. Kats, J.-P. Tetienne, N. Yu, M. O. Scully, L. Dal Negro, F. Capasso, “Multi-wavelength mid-infrared plasmonic antennas with single nanoscale focal point”, *Optics Express* 19, 22113 (2011)
- [12] M. A. Kats, N. Yu, P. Genevet, Z. Gaburro, F. Capasso, “Effect of radiation damping on the spectral response of plasmonic components”, *Optics Express* 19, 21749 (2011)
- [11] P. Genevet, J.-P. Tetienne, R. Blanchard, M. A. Kats, J. P. B. Muller, M. O. Scully, F. Capasso, “Enhancement of optical processes in coupled plasmonic nanocavities”, *Applied Optics* 50, 56 (2011)
- [10] N. Yu, P. Genevet, M. A. Kats, F. Aieta, Jean-Philippe Tetienne, F. Capasso, Z. Gaburro, “Light propagation with phase discontinuities: Generalized laws of reflection and refraction”, *Science* 334, 333 (2011) [featured on journal cover]
- Covered by *NBC News* [[link](#)], the *International Business Times* [[link](#)], and internationally by *ABC* (es), *Membrana* (ru), *Ansa* (it), among others.
- [09] M. A. Kats, D. Woolf, R. Blanchard, N. Yu, F. Capasso, “Spoof plasmon analogue of metal-insulator-metal waveguides”, *Optics Express* 19, 14860 (2011)
- [08] J-P Tetienne, R. Blanchard, N. Yu, P. Genevet, M. A. Kats, J. A. Fan, T. Edamura, S. Furuta, M. Yamanishi, F. Capasso, “Dipolar modeling and experimental demonstration of multi-beam plasmonic collimators”, *New Journal of Physics* 13, 53057 (2011)
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- [06] D. J. Lipomi, R. V. Martinez, M. A. Kats, S. H. Kang, P. Kim, J. Aizenberg, F. Capasso, G. M. Whitesides, “Patterning the tips of optical fibers with metallic nanostructures using nanoskiving”, *Nano Letters* 11, 2 (2010)
- [05] P. Genevet, J. P. Tetienne, E. Gatzogiannis, R. Blanchard, M. A. Kats, M. O. Scully, F. Capasso, “Large enhancement of nonlinear optical phenomena by plasmonic nanocavity gratings”, *Nano Letters* 10, 4880 (2010)
- [04] N. Yu, Q. J. Wang, M. A. Kats, J. A. Fan, S. P. Khanna, L. Li, A. G. Davies, E. H. Linfield, F. Capasso, “Designer spoof surface plasmon structures collimate terahertz laser beams”, *Nature Materials* 9, 730 (2010)
- [03] D. J. Lipomi, M. A. Kats, P. Kim, S. H. Kang, J. Aizenberg, F. Capasso and G. M. Whitesides, “Fabrication and replication of arrays of single- or multicomponent nanostructures by replica molding and mechanical sectioning”, *ACS Nano* 4, 4017 (2010) [featured on journal cover]

- [02] N. Yu, M. A. Kats, C. Pflugl, M. Geiser, Q. J. Wang, M. A. Belkin, F. Capasso, M. Fischer, A. Wittmann, J. Faist, T. Edamura, S. Furuta, M. Yamanishi, and H. Kan, “Multi-beam multi-wavelength semiconductor lasers”, *Applied Physics Letters* 95, 161108 (2009) [featured on journal cover]
- [01] F. Ahmad, D. Tseng, M. Kats, F. Rana, “Energy limits imposed by two-photon absorption for pulse amplification in high power semiconductor optical amplifiers”, *Optics Letters* 33, 1041 (2008)

BOOK CHAPTERS

- [2] M. A. Kats, Y. Yao, C. Wang, “Plasmonics and surface plasmons”, in *Encyclopedia of Plasma Technology*, Taylor & Francis (2017)
- [1] N. Yu, M. A. Kats, P. Genevet, F. Aieta, R. Blanchard, G. Aoust, Z. Gaburro, and F. Capasso, “Controlling light propagation with interfacial phase discontinuities”, in *Active Plasmonics and Tuneable Metamaterials*, Wiley (2013)

PATENTS

- [4] M. A. Kats, B. S. Gundlach, “Method and apparatus for augmenting human vision”. Provisional patent application filed August 2016. Utility filed August 2017.
- [3] N. Yu, F. Capasso, Z. Gaburro, P. Genevet, M. A. Kats, and F. Aieta, “Amplitude, phase and polarization plate for photonics”. Provisional application filed Aug 2011, international application filed Aug 2012, issued Sep 2014.
- [2] F. Aieta, M. Kats, P. Genevet, and F. Capasso, “Achromatic Metasurface Optical Components by Dispersive Phase Compensation”. Provisional application filed Dec 2014.
- [1] M. A. Kats, R. Blanchard, P. Genevet, F. Capasso, “Ultra-thin optical coatings and devices and methods of using ultra-thin optical coatings”, priority date June 2012, filing date June 2013, publication date Dec 2013.

PROFESSIONAL ACTIVITIES

Referee for *Physical Review Letters*, *Science*, *Nature Nanotechnology*, *Nature Communications*, *Optics Express*, *Optics Letters*, *Biomedical Optics Express*, *Applied Physics Letters*, *Nano Letters*, *IEEE Photonics Technology Letters*, *Laser and Photonics Reviews*, *Physical Review X*, *ACS Nano*, *Advanced Materials*, *Optica*, *Reports on Progress in Physics*, *Proceedings of the International Heat Transfer Conference*

Ad-hoc Editor for *PNAS* (2016-2017); Editorial board: *Scientific Reports* (2015-2016)

Conference Program Chair: *OSA Novel Optical Materials and Applications* (2018)

Symposium/session organizer: *META Conference* (2016), *IEEE Research and Applications of Photonics in Defense (RAPID) Conference* (2018)

Conference Organizing Committees: *OSA Novel Optical Materials and Applications* (2015, 2016, 2017), *IEEE Photonics Conference* (2015, 2016), *SPIE Photonics West* (2017)

Proposal Reviews for: National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), Department of Energy (DOE) Basic Energy Sciences; University of Mons (Belgium); US Army Natick Center

Member of OSA, SPIE, IEEE, MRS, APS, SWE, NAS Science and Entertainment Exchange

University Committees: ECE Graduate Admissions and Fellowships (2014-2015, 2015-2016, 2017-2018); MSE Seminars (2015-2016, 2016-2017, 2017-2018); Wisconsin Center for Applied Microelectronics Advisory (2015-2018, Chair in 2018); Applied Mathematics, Engineering, and Physics Program (AMEP) Undergraduate Advising (2016-2018); ECE Awards (2017-2018)

SEMINARS & COLLOQUIA

- [35] **Vanderbilt University**, Institute of Nanoscale Science and Engineering Seminar, Nashville, TN (2018)
- [34] **University of Washington**, Molecular Engineering Seminar, Seattle, WA (2018)
- [33] **Brown University**, School of Engineering, Providence, RI (2018)
- [32] **McMaster University**, Brockhouse Institute for Materials Research, Ontario, Canada (2017)
- [31] **University of Maryland**, College Park, MD (2017)

- [30] **Tel Aviv University**, Center for Light-Matter Interaction Seminar, Tel Aviv, Israel (2017)
- [29] **ASD(R&E)** (Assistant Secretary of Defense for Research and Engineering) Basic Research Forum, Washington, DC (2017)
- [28] **3M Company**, Tech Forum, St. Paul, MN (2017)
- [27] **Rensselaer Polytechnic Institute**, Materials Science and Engineering Seminar, Troy, NY (2017)
- [26] **Stanford University**, Special Seminar, Stanford, CA (2017)
- [25] **University of Michigan**, Physics Seminar, Ann Arbor, MI (2016)
- [24] **Wesleyan University**, Physics Seminar, Middletown, CT (2016)
- [23] **Helmholtz Center**, Virtual Institute Memriox Workshop, Dresden, Germany (2016)
- [22] **University of Jena**, Physics Seminar, Jena, Germany (2016)
- [21] **University of Victoria**, Optical Society of America Seminar, Victoria, Canada (2016)
- [20] **Naval Research Laboratory**, Research Seminar, Washington, DC (2016)
- [19] **Sandia National Laboratory**, SST Grand Challenge Seminar, Albuquerque, NM (2016)
- [18] **Argonne National Laboratory**, Center for Nanoscale Materials Seminar, Lemont, IL (2016)
- [17] **Harvard University**, Rowland Institute Research Seminar, Cambridge, MA (2015)
- [16] **University of Wisconsin – Madison**, R. G. Herb Condensed Matter Seminar, Madison, WI (2015)
- [15] **University of Wisconsin – Madison**, Materials Science Program Seminar, Madison, WI (2015)
- [14] **University of Illinois – Urbana Champaign**, Electrical and Computer Engineering Seminar, Champaign, IL (2015)
- [13] **Massachusetts Institute of Technology**, Media Lab Harvard/UCLA/MIT Triple Talks, Cambridge, MA (2014)
- [12] **Harvard University**, Electrical Engineering Seminar, Cambridge, MA (2014)
- [11] **Massachusetts Institute of Technology**, Mechanical Engineering Seminar, Cambridge, MA (2014)
- [10] **University of Wisconsin – Madison**, Electrical and Computer Engineering Seminar, Madison, WI (2014)
- [09] **Princeton University**, Electrical Engineering Seminar, Princeton, NJ (2014)
- [08] **Brown University**, Physics Colloquium, Providence, RI (2014)
- [07] **University of Pennsylvania**, Electrical and Systems Engineering Colloquium, Philadelphia, PA (2014)
- [06] **Massachusetts Institute of Technology**, Micro-Nano Seminar, Cambridge, MA (2014)
- [05] **California Institute of Technology**, Applied Physics Seminar, Pasadena, CA (2014)
- [04] **University of California – San Diego**, NanoEngineering Seminar, La Jolla, CA (2014)
- [03] **University of Washington**, Physics Colloquium, Seattle, WA (2014)
- [02] **Harvard University**, Center for Nanoscale Systems Seminar, Cambridge, MA (2013)
- [01] **Brown University**, School of Engineering Seminar, Providence, RI (2013)

INVITED CONFERENCE

PRESENTATIONS [first-author only; co-authored invited talks not listed]

- [21] M. A. Kats, “Limiting optical diodes”, IEEE Research and Applications of Photonics in Defense (RAPID), Miramar Beach (2018)
- [20] M. A. Kats, “Thermal-emission engineering using phase-transition materials”, SPIE Optics and Photonics, San Diego (2018)
- [19] M. A. Kats, “Dynamic control of infrared absorption and thermal emission using phase-transition materials”, SPIE Optics and Photonics, San Diego (2017)
- [18] M. A. Kats, “Photonics with low-index and multi-index materials”, OSA Novel Optical Materials and Applications (NOMA), New Orleans (2017)

- [17] M. A. Kats, “Enhancing human color vision by breaking binocular redundancy”, Canadian Chemistry Conference, Toronto, Canada (2017)
- [16] M. A. Kats, “Enhancing human color vision by breaking binocular redundancy”, Boston Photonics Centennial Conference, Boston, MA (2017)
- [15] M. A. Kats, “Tunable mid-infrared photonics with phase transition materials”, META Conference, Malaga, Spain (2016)
- [14] M. A. Kats, “Reconfigurable infrared photonics with phase-transition materials”, Novel Optical Materials and Applications (NOMA), Vancouver (2016)
- [13] M. A. Kats et al, “Active optical metasurfaces based on defect-engineered phase change materials”, Physics of Quantum Electronics, Snowbird, Utah (2016)
- [12] M. A. Kats, “Engineering of optical absorption and radiative thermal emission using vanadium dioxide”, META Conference, New York (2015)
- [11] M. A. Kats, “Ultra-thin optical interference coatings”, Canadian Chemistry Conference, Ottawa (2015)
- [10] M. A. Kats, “Tunable thin film optics and metamaterials based on vanadium dioxide”, Novel Optical Materials and Applications (NOMA), Boston (2015)
- [09] M. A. Kats (replacing Federico Capasso) et al, “Infrared applications of vanadium dioxide: a tunable disordered metamaterial”, SPIE Optics and Photonics, San Diego (2014)
- [08] M. A. Kats (replacing Federico Capasso) et al, “Mid-infrared nanoplasmonics on graphene: antenna-enhanced modulators and photodetectors”, SPIE Optics and Photonics, San Diego (2014)
- [07] M. A. Kats, “Thin film interference in ultra-thin layers: color coatings, tunable absorbers, and thermal emitters”, NanoLight, Benasque, Spain (2014)
- [06] M. A. Kats, “Origins of resonance broadening in plasmonic nanostructures”, Physics of Quantum Electronics, Snowbird (2014)
- [05] M. A. Kats (replacing Federico Capasso) et al, “Widely tunable plasmonic antennas with graphene and applications to high responsivity, high speed detectors”, Physics of Quantum Electronics, Snowbird (2014)
- [04] M. A. Kats et al, “Ultra-thin optical coatings based on strong interference effects in highly absorbing media”, SPIE Optics and Photonics, San Diego (2013)
- [03] M. A. Kats and F. Capasso, “New optical coatings and perfect absorbers based on strong interference effects in highly absorbing media”, Materials Research Society Spring Meeting, San Francisco (2013)
- [02] M. A. Kats, “Ultra-thin optical coatings and perfect absorbers based on strong interference effects in highly absorbing media”, Physics of Quantum Electronics, Snowbird (2013)
- [01] M. A. Kats et al, “Controlling electromagnetic fields with phase discontinuities”, SPIE Optics and Photonics, San Diego (2012)

CONFERENCE PRESENTATIONS

FROM KATS GROUP @ UW-MADISON

[underline] = Kats group member; co-authored talks included]

- [20] C. Wan, Z. Zhang, C. M. Hessel, J. Rensberg, D. Woolf, Y. Xiao, A. Shahsafi, J. Salman, S. Richter, R. Schmidt-Grund, C. Ronning, S. Ramanathan, M. A. Kats, “Optical properties of thin-film vanadium dioxide from the visible to the far infrared”, MRS Fall Meeting, Boston (2018)
- [19] R. Wambold, J. Salman, M. Hafermann, J. Rensberg, C. Wan, B. S. Gundlach, C. Ronning, M. A. Kats, “Monolithic doped-semiconductor platform for optical devices in the infrared”, IEEE Research and Applications of Photonics in Defense (RAPID), Miramar Beach (2018)
- [18] Y. Xiao, N. A. Charipar, A. Pique, and M. A. Kats, “Nanosecond mid-infrared pulse generation via modulated thermal emission”, IEEE Research and Applications of Photonics in Defense (RAPID), Miramar Beach (2018)
- [17] J. Salman, A. Shahsafi, C.-Y. Sun, S. Weibel, C. Drave, M. Frising, B. Gundlach; Y. Xiao, G. Kemeny, P. Gilbert, M. A. Kats, “Optical Paleothermometry Using Nacre”, Conference on Lasers and Electro-Optics (CLEO), San Jose (2018) [postdeadline talk]
- [16] Y. Xiao, N. Charipar, A. Pique, M. A. Kats, “Ultrafast pulse generation in the mid-infrared via modulated emissivity”, Conference on Lasers and Electro-Optics (CLEO), San Jose (2018) [poster]

- [15] Y. Xiao, A. Shahsafi, P. Roney, C. Wan, G. Joe, Z. Yu, J. Salman, and M. A. Kats, “Peculiarities of near-room-temperature thermal-emission measurements using FTIR spectroscopy”, Conference on Lasers and Electro-Optics (CLEO), San Jose (2018)
- [14] S. Niu, G. Joe, H. Zhao, M. Mecklenburg, H. Wang, M. Kats, and J. Ravichandran, “Study of optical anisotropy in a quasi-1D crystal, BaTiS₃”, APS March Meeting, Los Angeles (2018)
- [13] S. Niu, H. Zhao, G. Joe, H. Huyan, R. Kapadia, D. Singh, M. Kats, H. Wang, J. Ravichandran, “Transition Metal Perovskite Chalcogenides—Visible Luminescence to Anisotropic Infrared Absorption”, MRS Fall Meeting, Boston (2017)
- [12] Y. Xiao, A. Shahsafi, P. Roney, C. Wan, G. Joe, Z. Yu, J. Salman, and M. A. Kats, “Characterization of near-room-temperature thermal emitters”, OSA Novel Optical Materials and Applications (NOMA), New Orleans (2017)
- [11] M. Hafermann, J. Salman, J. Rensberg, C. Wan, R. Wambold, B. S. Gundlach, M. A. Kats, and C. Ronning, “Mid-infrared optical and plasmonic devices enabled by area-selective ion beam doping of silicon”, German Physical Society (DPG) Spring Meeting (2017)
- [10] P. J. Roney, A. Shahsafi, Z. Zhang, Y. Zhou, C. Wan, R. Wambold, J. Salman, S. Ramanathan, M. A. Kats, “Zero-Differential Thermal Emission Using Thermochromic Samarium Nickelate”, Conference on Lasers and Electro-Optics (CLEO), San Jose (2017)
- [9] A. Shahsafi, Y. Xiao, J. Salman, B. S. Gundlach, C. Wan, P. J. Roney, M. A. Kats, “Mid-Infrared Optics Using Low-Loss Materials with Refractive Index Below Unity”, MRS Spring, Phoenix (2017)
- [8] Z. Yu, C. Wan, B. S. Gundlach, J. Salman, Y. Xiao, Z. Yu, M. A. Kats, “Multi-Refractive-Index Metamaterials Using Subwavelength Waveguide Arrays”, MRS Spring, Phoenix (2017)
- [7] C. Wan, E. Horak, Y. Zhou, Z. Zhang, J. Salman, J. Rensberg, P. Roney, B. Gundlach, C. Ronning, S. Ramanathan, R. Goldsmith, M. A. Kats, “Optical power diodes based on phase-transition materials”, SPIE Photonics West, San Francisco (2017)
- [6] B. Gundlach, A. Shahsafi, G. Vershbow, C. Wan, J. Salman, B. Rokers, M. A. Kats, “Enhancing human color vision with thin-film optical filters by breaking binocular redundancy”, SPIE Photonics West, San Francisco (2017)
- [5] J. Salman, M. Hafermann, J. Rensberg, C. Wan, R. Wambold, B. Gundlach, C. Ronning, M. A. Kats, “Optical and Plasmonic Devices in the Infrared Using Ion-Implanted Semiconductors”, SPIE Photonics West, San Francisco (2017) [poster]
- [4] J. Rensberg, C. Wan, S. Richter, Y. Zhou, S. Zhang, R. Schmidt-Grund, S. Ramanathan, F. Capasso, M. A. Kats, Carsten Ronning “Wavelength- and temperature-tunable ultra-thin perfect absorbers using ion beam irradiation”, Materials Research Society (MRS), Boston (2016)
- [3] J. Rensberg, S. Zhang, Y. Zhou, A. S. McLeod, C. Schwarz, M. Goldflam, R. Nawrodt, M. Liu, J. Kerbusch, S. Ramanathan, D. N. Basov, F. Capasso, C. Ronning, M. A. Kats, “Metasurfaces based on artificially induced phase coexistence in phase-change materials”, Novel Optical Materials and Applications (NOMA), Boston (2015)
- [2] S. Zhang, J. Rensberg, Y. Zhou, A. S. McLeod, C. Schwarz, M. Goldflam, R. Nawrodt, M. Liu, J. Kerbusch, S. Ramanathan, D. N. Basov, F. Capasso, C. Ronning, M. A. Kats, “Effective medium designs based on defect engineering techniques on VO₂ thin films”, Materials Research Society (MRS), Boston (2015)
- [1] J. Rensberg, S. Zhang, Y. Zhou, A. S. McLeod, C. Schwarz, M. Goldflam, R. Nawrodt, M. Liu, J. Kerbusch, S. Ramanathan, D. N. Basov, F. Capasso, C. Ronning, M. A. Kats, “Defect engineering of VO₂ to create temperature-tunable meta-devices”, Materials Research Society (MRS), Boston (2015)

CONTRIBUTED CONFERENCE TALKS

BY KATS @ HARVARD [first-author only; co-authored contributed talks not listed]

- [14] M. A. Kats et al, “Perfect thermal emission and large broadband negative differential thermal emittance from a VO₂/sapphire thin film geometry”, MRS Fall Meeting, Boston (2013)
- [13] M. A. Kats et al, “Ultra-thin optical films for enhanced light absorption”, MRS Fall Meeting, Boston (2013)
- [12] M. A. Kats et al, “Negative differential thermal emitter”, SPIE Optics and Photonics, San Diego (2013)

- [11] M. A. Kats et al, "Negative differential thermal emitter", Conference on Lasers and Electro-Optics (CLEO/QELS), San Jose (2013)
- [10] M. A. Kats et al, "Ultra-thin tunable perfect absorber", SPIE Photonics West, San Francisco (2013)
- [9] M. A. Kats et al, "Monte-Carlo FDTD approach to modeling ensembles of polydisperse plasmonic nanoparticles", SPIE Photonics West, San Francisco (2013)
- [8] M. A. Kats et al, "Ultra-thin perfect absorber using a tunable phase change material", MRS Fall Meeting, Boston (2012)
- [7] M. A. Kats et al, "V- and Y-shaped plasmonic antennas for birefringent flat optics", SPIE Optics and Photonics, San Diego (2012)
- [6] M. A. Kats et al, "Ultra-thin reconfigurable perfect absorber enabled by phase co-existence in a correlated oxide", International Conference on Optical, Optoelectronic, and Photonic Materials and Applications, Nara, Japan (2012)
- [5] M. A. Kats et al, "Phase elements for surface optics", Conference on Lasers and Electro-Optics (CLEO/QELS), San Jose (2012)
- [4] M. A. Kats et al, "Spoof plasmon analogue of metal-insulator-metal waveguides", SPIE Photonics West, San Francisco (2012)
- [3] M. A. Kats et al, "Widely tunable V-shaped plasmonic antennas for planar optics", SPIE Photonics West, San Francisco (2012)
- [2] M. A. Kats et al, "Large area multi-material plasmonic nanostructures fabricated by replication molding and mechanical sectioning", Conference on Lasers and Electro-Optics (CLEO/QELS), San Jose (2010) [postdeadline talk]
- [1] M. Kats et al, "Amplification of high energy picosecond pulses using slab-coupled waveguide amplifiers at 1550 nm", Conference on Lasers and Electro-Optics (CLEO/QELS), San Jose (2008)

**GRANTS AND
CONTRACTS**

- [8] Title: CAREER: Molding the thermal emission of light
Sponsor: National Science Foundation
Years: 2018 – 2023
Amount: **\$500,000**
Role: **PI**
- [7] Title: Fully Passive and Ultra-Low-Power Technologies for Spectral Enhancement of Human Vision
Sponsor: Air Force Office of Scientific Research
Years: 2018 – 2021
Amount: **\$450,000**
Role: **PI**
- [6] Title: Switchable LWIR Filter Using Phase-change Materials
Sponsor: DARPA, via SBIR Phase I subcontract from PSI Inc.
Years: 2018
Amount: **\$25,000**
Role: **Subcontractor**
- [5] Title: Radiative Heat Transport and Optical Characterization of High Temperature Molten Salts
Sponsor: Department of Energy
Years: 2017 – 2020
Amount: **\$800,000** (Kats portion: \$150,000)
Role: **co-PI**, with PI Raluca Scarlat and co-PIs Mark Anderson and Mario Trujillo
- [4] Title: Far-infrared optoelectronics based on the valley Hall effect
Sponsor: Wisconsin Alumni Research Foundation
Years: 2017 – 2018
Amount: **\$39,270**
Role: **PI**

- [3] Title: MRI: Acquisition of an Electron Beam Lithography System for Nanofabrication at the UW-Madison and Regional Universities
Sponsor: National Science Foundation
Years: 2016 – 2018
Amount: **\$799,995**
Role: **co-PI**, with PI Mark Eriksson and co-PIs Junhong Chen, Robert McDermott, and Michael Arnold
- [2] Title: Young Investigator Program: Optical limiters, fuses, and diodes for protection from high intensity light sources
Sponsor: Office of Naval Research
Years: 2016 – 2019
Amount: **\$510,000**
Role: **PI**
- [1] Title: Phase change metasurfaces
Sponsor: Wisconsin Alumni Research Foundation
Years: 2016 – 2017
Amount: **\$38,823**
Role: **PI**

TEACHING EXPERIENCE

University of Wisconsin – Madison

ECE 601/901: Nanophotonics

Fall 2015, 2016, 2017

- **Re-designed from scratch** a graduate-level course covering photonics at nanometer and micrometer length scales. Topics include: EM waves in dielectrics and metals; computational electromagnetics; waveguides and waveguide coupling; optical resonators; basic nanofabrication techniques; thin-film interference; surface plasmon polaritons; localized surface plasmon resonances; applications of plasmonics; super-resolution imaging; composite materials and metamaterials; metasurfaces.
- Course evaluations: **4.8/5** (2015), **4.8/5** (2016), **4.9/5** (2017)

ECE 434: Photonics

Spring 2015, 2016, 2017, 2018

- **Re-designed from scratch** an introductory undergraduate-level course on optics and photonics. Topics include: Maxwell's equations; electromagnetic waves; polarization states; various speeds of light; ray optics; optical properties of materials; optics of interfaces; applications of total internal reflection; fiber communication; optical properties of metals; interference and interferometers; thin-film optics; basic materials characterization; microscopes and telescopes; human eye and visual system; light sources
- Course evaluations: **4.7/5** (2015), **4.8/5** (2016), **4.1/5** (2017), **4.8/5** (2018)

Harvard University (as Teaching Fellow)

ES 174: Photonics and Electronics Lab

Spring 2010

- Led lab sessions for a senior-level course in electronic and photonic devices, and micro-fabrication technology.

Cornell University (as Teaching Assistant / Grader)

AEP 321 and 322: Mathematical Physics I and II

Fall 2006 – Spring 2007

- Held office hours and graded for a year-long junior-level course in mathematical methods for physics and engineering.

RESEARCH ADVISING AND MENTORING AT UW-MADISON

PhD Students

Chenghao Wan (MSE, 2015-present)

Alireza Shahsafi (ECE, 2016-present)

Zhaoning (April) Yu (Physics, 2016-present)
Raymond Wambold (ECE, 2016-present)
Jad Salman (ECE, 2017-present)
Bryan Rubio (ECE, 2018-present)
Hongyan (May) Mei (ECE, 2018-present)

MS Students (terminal)

Bradley Gundlach (ECE, 2015-2018), *graduated (medical school at UCLA on a full fellowship)*
Patrick Roney (ECE, 2015-2017), *graduated (job after UW: staff at Sandia National Laboratories)*
Jad Salman (ECE, 2015-2016), *graduated (returned for PhD studies at UW-Madison)*

Postdocs

Yuzhe Xiao (2016 – present)

Research Interns

Jonathan King (2017), *job after UW: Jensen Hughes*

Visiting graduate students

Michel Frising (ETH – Zurich, 2017), *received 6.0/6.0 on his thesis at ETH for work done at UW-Madison, returned to ETH Zurich to complete his degree*

Undergraduate students @ UW-Madison

Nolan Urbanek (Fall 2016), *graduated (job after UW: electro-optic / infrared sensors group at Boeing)*
Anthony Wang (Fall 2016), *graduated (returned as research intern at UW-Madison)*
Nicholas Stanisis (Fall 2017, Spring 2018)
Shaoheng Zhou (Spring, Summer 2018)
Jack Yang (Spring, Summer 2018)

Visiting undergraduate students

Manuel Martinez (UT-El Paso, Summer 2016), *returned to UT to finish degree, then PhD program*
Graham Joe (Waterloo, Spring - Summer 2017), *returned to Waterloo to finish degree, then PhD program at Harvard*
Bryan Rubio (University of New Mexico, Summer 2017), *returned to UNM to finish degree, then PhD program at UW-Madison*

PhD Thesis Committees

Solomon Mikael (ECE, 2015); Hongyi Mi (ECE, 2015); Guilhem Ribeill (Physics, 2016); Dong-Wook Park (ECE, 2016); Xiangyu Guo (ECE, 2016); Amirhossein Davoody (ECE, 2016); Hung Luyen (ECE, 2017); Ting-Yen Shih (ECE, 2017); Meng-Yin Wu (MSE, 2017); Farhad Karimi (ECE, 2017); Joshua Isaacs (Physics, 2017); Zhu Wang (ECE, 2018); Matthew Beck (Physics, 2018); Zhu Wang (ECE, 2018)

Preliminary Exam Committees

Xiangyu Guo (ECE, 2015); Hung Luyen (ECE, 2015); Ting-Yen Shih (ECE, 2015); Dong-Wook Park (ECE, 2015); Solomon Mikael (ECE, 2015); Meng-Yin Wu (MSE, 2016); Zhu Wang (ECE, 2017), Soongyu Yi (ECE, 2017), Michelle King (MSE, 2017); Kevin Oresick (ECE, 2017); Zhenyang Xia (ECE, 2018); Jialiang Wang (MSE, 2018); Yixuan Tan (ECE, 2018)

MS Thesis Committees

Chenghao Wan (MSP, 2015); Jonathan King (Eng. Physics, 2016); Andrew Witte (MSE, 2018)

Kats Group Student Awards (entering, during, and immediately after working with Kats)

- [9] Department of Defense SMART Fellowship (2018, [Raymond Wambold](#))
- [8] Directed Energy Professional Society Scholarship (2017, [Raymond Wambold](#))
- [7] Advanced Materials Industrial Consortium Seed Project (2016, [Nolan Urbanek](#) and [April Yu](#))
- [6] Walsh Research Travel Award, McPherson Eye Research Institute (2016, [Bradley Gundlach](#))
- [5] Honorable Mention (2nd place), McPherson ERI Vision Science Poster Session (2016, [Bradley Gundlach](#))
- [4] Wisconsin Distinguished Graduate Fellowship (2016, [Raymond Wambold](#))
- [3] Frank Rogers Bacon Fellowship (2015, [Jad Salman](#))
- [2] NSF Graduate Research Fellowship (2015, [Bradley Gundlach](#))
- [1] Sandia National Labs Critical Skills Master's Program Fellowship (2015, [Patrick Roney](#))

Undergraduate Project Advising

Advisor for Zanmi Limye (“Partners in Light”, spun off from Engineers Without Borders), an undergraduate student group implementing a solar-energy project in Haiti

ETCETERA

Citizenship: USA

Languages: English and Russian

Erdős number ≤ 4