

Josué J. López

Massachusetts Institute of Technology
Cambridge MA, 02139
Email: jjlopez at mit dot edu
Cell: (323) 304-0329

Education

Massachusetts Institute of Technology, Cambridge, MA Expected 05/2021
Doctor of Philosophy in Electrical Engineering & Computer Science
Concentration: Applied Physics & Devices
Thesis: On-Chip Nanophotonic Designs for Optical Beam Steering and LiDAR Applications
Advisor: Prof. Marin Soljačić

Massachusetts Institute of Technology, Cambridge, MA 06/2017
Master of Science in Electrical Engineering & Computer Science
Thesis: Characterization of Nanostructured Hexagonal Boron Nitride Patterned Via High-Resolution Ion Beam Lithography
Advisor: Prof. Marin Soljačić

Rice University, Houston, TX 05/2014
Bachelor of Science in Physics with Distinction in Research
Thesis: Bimetallic Gold (Au)/Silver (Ag) Nanoparticles - Towards Correlation of Dark Field Spectroscopy and Transmission Electron Microscopy
Advisor: Prof. Jason H. Hafner

Select Fellowships

Activate Entrepreneurial Research Fellowship (DARPA funded), 9 Fellows/120 Applicants 2020–Present
Facebook Fellowship (AR/VR Photonics and Optics), 28 Fellows/900 Applicants 2019–Present
Alfred P. Sloan Foundation Graduate Scholarship 2017–2020
National GEM Consortium Fellowship 2017–2018
National Science Foundation Graduate Research Fellowship 2014–2019
MIT Lemelson Presidential Graduate Fellowship 2014–2015

Professional Experience

Kyber Photonics, Co-founder and Activate Entrepreneurial Research Fellow 01/2019–Present
• MIT startup that is enabling autonomous vehicles and machines to see the world via next generation LiDAR technology and is meeting the industry needs of cost, reliability, performance, and scalability

Prior Research Experience

Rice University, Physics & Astronomy 09/2011–05/2014
Undergraduate Researcher, Advisor: Prof. Jason H. Hafner
• Used dark field spectroscopy to identify geometry and composition dependent plasmonic peaks of bimetallic gold (core)/silver (shell) nanoparticles

California Institute of Technology, Applied Physics & Material Science 06/2012–08/2013
Summer Researcher, Advisor: Prof. Harry A. Atwater Jr.
• Developed code to laser write 3D photonic crystals for telecommunication research
• Determined fabrication protocol for state-of-the-art 3D nanofabrication technique
• Improved crystal growth of graphene that led to a record 100x light confinement in optical resonators

Northwestern University, Material Science & Engineering
 Summer Researcher, Advisor: Prof. Mark C. Hersam

06/2010–08/2011

- Experimentally demonstrated fundamental trends in the self-assembly process of carbon nanotube thin films well suited for transparent conductor applications

California Institute of Technology, Applied Physics & Material Science
 Summer Researcher, Advisor: Prof. Julia R. Greer

06/2008–08/2009

- Demonstrated that the radiation hardness of single-layer graphene is 7x greater than predicted by theory
- Used Raman spectroscopy to characterize the composition of graphene and other nanomaterials

Research and Entrepreneurship Grants

Activate Entrepreneurial Research Fellow, Co-Founder of Kyber Photonics, Total \$642.8k [\[link\]](#)

Award: \$527.8k, Activate Fellowship (DARPA), “Wide-field-of-view chip-scale LiDAR for autonomous machines”

Award: \$75k, AVNET Innovation Lab Grant, “Wide-field-of-view chip-scale LiDAR for autonomous machines”

Award: \$25k, Arizona State University Innovation Open (ASUio), “Wide-field-of-view chip-scale LiDAR for autonomous machines”

Award: \$15k, MIT Sandbox Innovation Fund, “Wide-field-of-view chip-scale LiDAR for autonomous machines”

Graduate Student, Co-Lead and Grant Co-Writer, Total \$336.5k

Award: \$50k, MIT Deshpande Jack Turner Entrepreneurship Grant, “Wide-field-of-view chip-scale LiDAR for autonomous machines” 2020-2021

Award: \$136.5k, National Aeronautics and Space Administration, “Joint Augmented Reality Visual Informatics System (JARVIS) Prototype Optics Development” 2020-2021

Award: \$150k, Office of Naval Research, “Bridging the Nano–Macro gap for 3D Optical/Multi-functional Metamaterials” 2017-2020

Publications and Presentations (Citations > 1300, h-index = 11) [\[Link to profile and publications\]](#)

Journal Papers

(16) Sun, Y.; **López, J. J.** et al. Dielectric Flat Lenses Fabricated by Implosion Fabrication, *In Preparation*

(15) Elfadil, A.; **López, J. J.** et al. 3D Metamaterials Fabricated by Implosion Fabrication, *In Preparation*

(14) **López, J. J.** et al. On-Chip Photonic Crystal Luneburg Lens for Wide Field-of-View LiDAR, *In Preparation*

(13) **López, J. J.** et al. Planar-lens Enabled Beam Steering for Chip-scale LiDAR, *In Preparation*

(12) **López, J. J.**; Ambrosio, A.; Dai, S.; Huynh, C.; Bell, D. C.; Lin, X.; Rivera, N.; Huang, S.; Ma, Q.; Eyhusen, S.; et al. Large Photothermal Effect in Sub-40 Nm H-BN Nanostructures Patterned Via High-Resolution Ion Beam. *Small* **2018**, *14* (22).

(11) Qian, C.; Lin, X.; Yang, Y.; Gao, F.; Shen, Y.; **López, J. J.**; Kaminer, I.; Zhang, B.; Li, E.; Soljačić, M.; et al. Multifrequency Superscattering from Subwavelength Hyperbolic Structures. *ACS Photonics* **2018**, *5* (4), 1506–1511.

(10) Lin, X.; Yang, Y.; Rivera, N.; **López, J. J.**; Shen, Y.; Kaminer, I.; Chen, H.; Zhang, B.; Joannopoulos, J. D.; Soljačić, M. All-Angle Negative Refraction of Highly Squeezed Plasmon and Phonon Polaritons in Graphene–boron Nitride Heterostructures. *Proc. Natl. Acad. Sci.* **2017**, *114* (26), 6717–6721.

(9) Kaminer, I.; Kooi, S. E.; Shiloh, R.; Zhen, B.; Shen, Y.; **López, J. J.**; Remez, R.; Skirlo, S. A.; Yang, Y.; Joannopoulos, J. D.; et al. Spectrally and Spatially Resolved Smith-Purcell Radiation in Plasmonic Crystals with Short-Range Disorder. *Phys. Rev. X* **2017**, *7* (1), 11003.

(8) Lin, X.; Rivera, N.; **López, J. J.**; Kaminer, I.; Chen, H.; Soljačić, M. Tailoring the Energy Distribution and Loss of 2D Plasmons. *New J. Phys.* **2016**, *18* (10), 105007.

- (7) Kaminer, I.; Katan, Y. T.; Buljan, H.; Shen, Y.; Ilic, O.; **López, J. J.**; Wong, L. J.; Joannopoulos, J. D.; Soljačić, M. Efficient Plasmonic Emission by the Quantum Čerenkov Effect from Hot Carriers in Graphene. *Nat. Commun.* **2016**, *7*.
- (6) Regan, E. C.; Shen, Y.; **López, J. J.**; Hsu, C. W.; Zhen, B.; Joannopoulos, J. D.; Soljacic, M. Substrate-Independent Light Confinement in Bioinspired All-Dielectric Surface Resonators. *ACS Photonics* **2016**.
- (5) Brar, V. W.; Jang, M. S.; Sherrott, M.; Kim, S.; **López, J. J.**; Kim, L. B.; Choi, M.; Atwater, H. Hybrid Surface-Phonon-Plasmon Polariton Modes in Graphene/Monolayer H-BN Heterostructures. *Nano Lett.* **2014**, *14* (7), 3876–3880.
- (4) Jang, M. S.; Brar, V. W.; Sherrott, M. C.; **López, J. J.**; Kim, L.; Kim, S.; Choi, M.; Atwater, H. A. Tunable Large Resonant Absorption in a Midinfrared Graphene Salisbury Screen. *Phys. Rev. B* **2014**, *90* (16), 165409.
- (3) Brar, V. W.; Jang, M. S.; Sherrott, M.; **López, J. J.**; Atwater, H. A. Highly Confined Tunable Mid-Infrared Plasmonics in Graphene Nanoresonators. *Nano Lett.* **2013**, *13* (6), 2541–2547.
- (2) Shastry, T. A.; Seo, J.-W. T.; **López, J. J.**; Arnold, H. N.; Kelter, J. Z.; Sangwan, V. K.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Large-Area, Electronically Monodisperse, Aligned Single-Walled Carbon Nanotube Thin Films Fabricated by Evaporation-Driven Self-Assembly. *Small* **2013**, *9* (1), 45–51.
- (1) **López, J. J.**; Greer, F.; Greer, J. R. Enhanced Resistance of Single-Layer Graphene to Ion Bombardment. *J. Appl. Phys.* **2010**, *107* (10), 104326.

Conference Papers and Proceedings

- (6) Kim, S.; Sloan, J.; **López, J. J.**; Kharas, D.; Herd, J.; Bramhavar, S.; Juodawlkis, P.; Barbastathis, G.; Johnson, S.; Sorace-Agaskar, C.; Soljačić, M. Luneburg Lens for Wide-Angle Chip-Scale Optical Beam Steering. In *Conference on Lasers and Electro-Optics (2019)*, paper SF3N.7; OSA.
- (5) [**Upgraded to Invited**] **López, J. J.**; Skirlo, S. A.; Kharas, D.; Sloan, J.; Herd, J.; Juodawlkis, P.; Soljačić, M.; Sorace-Agaskar, C. Planar-Lens Enabled Beam Steering for Chip-Scale LIDAR. In *Conference on Lasers and Electro-Optics (2018)*, paper SM3I.1; OSA.
- (4) Lin, X.; Lin, X.; Yang, Y.; Rivera, N.; **López, J. J.**; Shen, Y.; Kaminer, I.; Chen, H.; Chen, H.; Joannopoulos, J. D.; Soljačić, M. All-Angle Negative Refraction of Highly Squeezed Polaritons in Graphene-Boron Nitride Heterostructures. In *Conference on Lasers and Electro-Optics (2017)*, paper FTu4H.2; OSA.
- (3) Kaminer, I.; Kaminer, I.; Kooi, S. E.; Shiloh, R.; Zhen, B.; Zhen, B.; Shen, Y.; **López, J. J.**; Remez, R.; Skirlo, S. A.; Yang, Y.; Joannopoulos, J. D.; Joannopoulos, J. D.; Arie, A.; Soljačić, M.; Soljačić, M. Smith-Purcell Radiation in the Presence of Short-Range Disorder. In *Conference on Lasers and Electro-Optics (2017)*, paper FTu1G.6; OSA.
- (2) Regan, E. C.; Regan, E. C.; Shen, Y.; **Lopez, J. J.**; Hsu, C. W.; Zhen, B.; Zhen, B.; Joannopoulos, J. D.; Soljačić, M. Substrate-Independent Light Confinement in Butterfly-Inspired Photonic Crystal Slabs. In *Conference on Lasers and Electro-Optics (2016)*, paper SM3R.4; OSA.
- (1) Kaminer, I.; Katan, Y. T.; Buljan, H.; Shen, Y.; Ilic, O.; **López, J. J.**; Wong, L. J.; Joannopoulos, J. D.; Soljačić, M. Electrical Excitation of Plasmons in Graphene through the 2D Čerenkov Effect. In *Conference on Lasers and Electro-Optics (2016)*, OSA.

Invited Technical Presentations

“Nanophotonic designs for wide field-of-view chip-scale LiDAR,” *MIT.nano Nanoexplorations Webinar*, June 2020, Cambridge, MA

“Novel photonics for optical beam steering and novel 3D fabrication toward complex metamaterials,” *Division of Physics and Applied Physics*, Nanyang Technological University, July 2019, Singapore

“High-Resolution Ion Beam Patterning of 2D Materials,” *MIT Lincoln Laboratory HLN Technical Seminar*, August 2016, Lexington, MA

“High-Resolution Ion Beam Patterning of 2D Materials,” *New England Society for Microscopy Fall Meeting*, October 2016, Peabody, MA

Other Technical Presentations and Posters

“All-dielectric Materials Integration for Planar-lens-based Optical Beam Steering,” *MRS Fall Meeting*, November 2018, Boston, MA

“Large Photo-Thermal Effect in Sub-40 nm h-BN Nanostructures Measured via SPM,” *Optical Scanning Probe Microscopy of 2D Quantum Materials, Harvard University*, October 2018, Cambridge, MA

“Large Photo-Thermal Effect in Sub-40 nm h-BN Nanostructures Patterned via High-Resolution Ion Beam,” *APS March Meeting*, March 2018, Los Angeles, CA

“High-Resolution Ion Beam Patterning of Hexagonal Boron Nitride Gratings for Defect-Tolerant Mid-Infrared Phonon Polaritons,” *Gordon Research Conference*, July 2016, Newry, ME

Online Articles and Editorials on Entrepreneurship, Equity, and Climate

[*Invited Guest Article*]: “MIT Spinoff Building New Solid-State Lidar-on-a-Chip System”, *IEEE Spectrum*, December 2020 [\[link\]](#)

“Student Evaluation on the Progress of the 2015 BSU/BGSA Recommendations,” *The Tech*, June 2020 [\[link\]](#)

“Marching for Science and Climate Protects Our Communities,” *Union of Concerned Scientists*, April 2017 [\[link\]](#)

Patents

López, J. J.; Kim, S.; Sloan, J.; Kharas, D.; Herd, J.; Barbastathis, G.; Johnson, S.; Bramhavar, S.; Sorace-Agaskar, C.; Soljačić, M. “Planar Luneburg Lens System for Two-Dimensional Optical Beam Steering,” US Patent Provisional Application February 2020

Journals Refereed

ACS Nano Letters, IEEE Journal of Selected Topics in Quantum Electronics, IEEE Photonics Journal, Optics Express

Academic Honors and Awards (Complete List)

Activate Entrepreneurial Research Fellowship (DARPA funded), 9 Fellows/120 Applicants	2020–Present
Winner, Arizona State University Innovation Open (ASUio)	2020
Facebook Fellowship (AR/VR Photonics and Optics), 28 Fellows/900 Applicants	2019–Present
1 st Place, MIT LL-Institute for Soldier Nanotechnologies Design Competition	2019
NextProf Nexus Selectee (UC Berkeley)	2018
Alfred P. Sloan Foundation Graduate Scholarship	2017–2020
National GEM Consortium Fellowship	2017–2018
National Science Foundation Graduate Research Fellowship	2014–2019
MIT Lemelson Presidential Graduate Fellowship	2014–2015
Wagoner Foreign Study Scholarship, Rice University	2014
American Physical Society Minority Scholarship	2012–2013
Gordon and Betty Moore Foundation Summer Research Fellowship	2012
Alliance/Merck Ciencia National Scholarship	2012
Mellon Mays Undergraduate Fellowship	2012–2014
Math, Engineering, and Science Achievement Transfer Scholarship, State of California	2010
Kavli Nanoscience Institute Research Scholarship, California Institute of Technology	2008–2009

Leadership and Service Awards

MIT Mens et Manus “Mind and Hand” Convocation Award	2020
MIT Martin Luther King Jr. Leadership Award	2018
MIT Unsung Hero Award	2017

Teaching and Academic Service

Research Supervision

Amel Amin Elfadil, MIT, undergraduate researcher	07/2019–Present
Yong Hui Lim, MIT, undergraduate researcher	09/2019–05/2020
Neil Aggarwal, MIT, undergraduate researcher	04/2016–12/2016
Priya Kikani, MIT, undergraduate researcher	02/2016–05/2016
Chad Auginash, University of Minnesota Duluth, undergraduate researcher	04/2015–08/2016

Teaching

15.359/6.901 Engineering Innovation, MIT EECS/School of Management	08/2019–12/2019
Guest Speaker, MIT WGS.160 Science Activism: Gender, Race, and Power	10/2019

Invited Panelist and Speaker on Entrepreneurship, Equity, and Climate

Panelist, GEMpreneur Series: Entrepreneurship Voices from the Field	11/2020
Speaker, Sustainable Governance Summit: Achieving Climate Security	10/2020
Speaker, MIT SEED Academy Final Symposium	04/2019
Panelist, StartMIT Entrepreneurship Program	01/2019
Speaker, MIT Martin Luther King Jr. Leadership Award Ceremony	02/2018
Master of Ceremonies, MIT March for Science	04/2017
Panelist, MIT “Connection between Averting Climate Change and Averting Nuclear War”	04/2017

Diversity, Equity, and Inclusion Service

MIT Graduate Student Council, <i>Vice-Chair of Diversity, Equity, Inclusion Committee</i>	06/2018–07/2019
MIT Academic Council Working Group, <i>Member</i>	01/2018–08/2020
MIT Graduate Students of Color Advisory Council, <i>Founding Member</i>	08/2017–08/2020
MIT Academy of Courageous Minority Engineers, <i>President</i>	08/2017–05/2018
MIT EECS Department Diversity Statement Committee, <i>Member</i>	12/2016–07/2020
MIT Office of Graduation Education, <i>Diversity Ambassador</i>	04/2016–08/2020
Rice University Empowering Leadership Alliance, <i>Student Board Member</i>	09/2011–05/2014

Academic Service

MIT EECS, Visiting Committee, <i>Graduate Student Panel and Report Writer</i>	04/2019
MIT Forum on Racial and Environmental Equity and Justice, <i>Co-Chair of Committee</i>	12/2016–05/2017
MIT Applied Physics Club Colloquium, <i>Co-Organizer</i>	09/2016–05/2017
Department of Defense Future Directions Workshop for Power and Energy, <i>Report Writer</i>	02/2016
MIT Summer Research Program, <i>Application Reviewer and Mentor</i>	04/2015–02/2017
Rice University Society of Physics Students, <i>Co-President</i>	08/2013–05/2014

Academic and Professional Affiliations

Materials Research Society	2015–Present
Institute of Electrical and Electronics Engineers	2014–Present
American Chemical Society	2014–Present
American Physical Society	2012–Present