

March 23, 2024

Tomás Palacios

Massachusetts Institute of Technology (MIT)

Professor, Department of Electrical Engineering and Computer Science (EECS),
School of Engineering (SOE)

1. EDUCATION:

<u>School</u>	<u>Degree</u>	<u>Date</u>
Polytechnic University of Madrid, Spain	B.S/M.Sc.	2001
University of California, Santa Barbara	M.Sc.	2004
University of California, Santa Barbara	Ph.D.	2006

2. TITLE OF THESIS FOR MOST ADVANCED DEGREE:

Optimization of the High Frequency Performance of Nitride-based Transistors

3. PRINCIPAL FIELDS OF INTEREST:

Semiconductor device physics; nanotechnology; electronics

4. NON-MIT EXPERIENCE (INCLUDING MILITARY SERVICE):

<u>Employer</u>	<u>Position</u>	<u>Beginning</u>	<u>Ending</u>
Polytechnic University of Madrid	Underg. Research Asst.	June 1997	Sept. 2001
Polytechnic University of Madrid	Grad. Research Asst.	Sept. 2001	July 2002
Univ. of California, Santa Barbara	Grad. Research Asst.	July 2002	March 2006
Univ. of California, Santa Barbara	Project Scientist	March 2006	June 2006

5. HISTORY OF MIT APPOINTMENTS:

<u>Rank</u>	<u>Beginning</u>	<u>Ending</u>
Assistant Professor	Aug. 2006	June 2010
Associate Professor (without tenure)	July 2010	June 2012
Associate Professor (with tenure)	July 2012	June 2016
Professor (with tenure)	July 2016	present
Director, Microsystems Technology Laboratories, MTL	Dec 2022	present

6. GOOGLE SCHOLAR PUBLICATIONS AND CITATIONS:

[Click here to visit Tomás Palacios Google Scholar profile](#)

(Total: 580+; Google Scholar Citations: 37473 +; h-index: 95, >10 best paper awards, including 2 papers selected for the best paper of the year (2012, 2019) in IEEE Electron Device Letters.)

7. DEPARTMENT AND INSTITUTE COMMITTEES, OTHER ASSIGNED DUTIES:

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
Member, MIT-Spain MISTI Advisory Board	Jan. 2007	July 2008

Member of the EECS Graduate Admission Committee	Dec. 2007	present
Member, MTL Process Technology Committee	Jan. 2008	present
Member, MIT 2020 Committee	Oct. 2008	2010
Chair, MTL Seminar Series Committee	Jan. 2009	Apr. 2015
MTL Faculty Liaison with Veeco Instruments	Mar 2009	July 2012
Member, MTL Policy Board	Sept 2010	Sept. 2012
Member, MIT-Lincoln Lab Campus Interaction Committee	Sept 2010	present
Director, MIT Center for Graphene Devices and Systems	Sept 2010	present
Member, EECS Undergraduate Experience Committee	Aug 2011	July 2012
Director, MIT GaN Energy Initiative	Sept 2011	present
Chair, MIT-Lincoln Lab Campus Interaction Committee	Sept 2013	Sept. 2018
Member, MIT Campaign Launch Committee	June 2014	June 2014
Member, MTL Equipment Acquisition Committee	Oct 2014	present
Faculty Lead MIT/Masdar Institute Microsystems program	Feb 2015	2017
Member, EECS Curriculum Committee (ECC)	June 2015	Sep. 2016
Member, EECS Department Head Search Committee	April 2016	June 2016
Member, EECS Faculty Search Committee	Sept 2015	present
Member, EE Revitalization Committee	Sept 2016	2017
Member, EECS Department Head Search Committee	June 2017	Oct. 2017
Member, Committee for Prof. Dresselhaus (Memorial Workshop)	Apr 2017	Dec. 2017
Member, EE Graduate Student Admission Committee	Sept 2018	present
Chair, EE Hardware Faculty Search Sub-Committee	Sept 2018	June 2021
Member, Committee on Nominations	Sept 2018	June 2019
Chair, Committee on Nominations	Sept 2019	June 2021
Industry Officer, Department EECS	2015	Jan 2023
<i>Designed and implemented the new EECS Alliance program</i>		
Director, EECS 6A MEng Thesis Program.	Jun. 2015	present
Founder and Faculty Director, Northeast Microelectronics Internship Program (NMIP)	2020	present
Member, DMSE-SCC Joint Faculty Search Committee	2022	2023
Co-Director of the SRC SUPREME Center	2022	present
Representative, MIT Massachusetts Edge Center	2022	present
Representative, ON BEHALF OF MIT TO NEMC on the State proposal to the Microelectronics Commons program	2022	present
Director, Microsystems Technology Laboratories(MTL) DLC	Dec 2002	present

8. PROFESSIONAL SERVICE:

<u>Activity</u>	<u>Beginning</u>	<u>Ending</u>
Member of the International Advisory Committee of the 12th International Conference on Electrical and Computer Engineering ICECE 2022 Dhaka, Bangladesh	2022	present
Member of the Editorial Board of the physica status solidi journal	2022	present
Associate Director, Superior Energy-Efficient Materials and Devices (SUPREME) Center, SRC JUMP 2.0 Consortium	2022	present
Director for Knowledge Transfer in the NSF-Science and Technology Center of Integrated Quantum Materials		
MIT Representative in the Northeast Microelectronics Coalition (NEMC), one of the 8 Microelectronics Commons Hubs of the Department of Defense.		
MIT Representative in the Micron University Network.	2022	present
Chair of the MIT Committee on the Undergraduate Program (CUP)		
Chair of the Blue Sky Research Committee within the School of Engineering		
Member, MIT-Spain MISTI Advisory Board		
General Chair, VLSI Symposium on Technology and Circuits	2022	present
Member of the Steering Committee for the Indium Phosphide and Related Materials Conference, an annual international conference with ~400 attendees. As the previous conference chair, I was tasked to help and supervised the organization of the 2022 Compound Semiconductor Conference (CSW).	2022	present
Member of the IEEE Education Award Committee in the Electron Device Society	2022	present
Guest editor of a special issue of Applied Physics Letters on power electronics	2022	present
Director of Knowledge Transfer (NSF-Science and Technology Center of Integrated Quantum Materials)	2022	present
Associate Editor of the IEEE Electron Device Letters (top journal in my research field of semiconductor devices)	2022	present
Short course organizer for the 2022 International Symposium on Power Semiconductor Devices and IC	2022	present
Chair of the GaN Technical Program Committee of the 2022 and 2023 International Symposium on Power Semiconductor Devices and IC's	2022	present
Member of the Technical Program Committee of several international conferences, including the International Workshop on Compound Semiconductors, the International Electron Device Meeting, the International Symposium on Power Semiconductor Devices and IC and the International Conference on Nitride Semiconductors.	2022	present
Founding member of the Nanotechnology Subcommittee of the IEEE Microwave Theory and Techniques Society.	2022	present
Reviewer for several research proposals from the AFOSR and ARO.	2022	present
Member of the SRC Microelectronic and Advanced Packaging Technologies (MAPT) Roadmap	2022	present
General Chair of the IEEE Symposium on VLSI Technology and Circuits	June 2021	2022
Short Course organizer of the IEEE ISPSD	2022	2022
Chair of the Electron Beam Lithography Committee of MIT.nano	Dec. 2019	present
Chair of the Fab.nano Faculty Advocates Group	Dec. 2019	present

Director of the MTL Center for Graphene Devices and Systems.	Dec. 2019	present
Member of the MTL Policy Board	Dec. 2019	present
Member of the MTL Grand Challenge Committee	Dec. 2019	present
Member of Executive Committee of the IEEE Symposium on VLSI Technology and Circuits	2018	present
Chair of the International Steering Committee of the Indium Phosphide and Related Materials Conference	2018	2020
Director of Knowledge Transfer (NSF-Science and Technology Center of Integrated Quantum Materials)	2018	present
Technical Program Chair of the VLSI Technology Symposium	2018	2020
General Chair of the 2018 Compound Semiconductors Week Conference, which combines the 45th International Symposium on Compound Semiconductors (ISCS), and the 30th International Conference on Indium Phosphide and Related Materials (IPRM)	2017	2018
Secretary of the VLSI Technology Symposium	2016	2018
Associate Editor of the IEEE Electron Device Letters	2016	present
Chair of the International Steering Committee of the Indium Phosphide and Related Materials Conference	2015	2016
General Co-chair of the 2016 International Workshop on Compound Semiconductors	2015	2016
Technical Program Chair, 2015 Compound Semiconductor Week Conference, which combines the 42nd International Symposium on Compound Semiconductors (ISCS), and the 27th International Conference on Indium Phosphide and Related Materials (IPRM)	2014	2015
Co-Organizer, Symposium CC in the Spring 2015 Materials Research Society Meeting	2014	2015
Guest Editor of the March 2014 Issue of the IEEE Transactions on Electron Devices	2012	2014
Referee: <i>Proceedings of the IEEE</i>	2011	present
Referee: <i>Nano Letters</i>	2011	present
Referee: <i>Nature Materials</i>	2011	present
Referee: <i>Nature Communications</i>	2011	present
Guest Editor, April 2013 Issue of the Proceedings of IEEE on Emerging Graphene-Based Electronic and Photonic Devices, Circuits and Systems	2011	2013
Reviewer of projects for the Japan Society for Promotion of Science	2010	present
Reviewer of projects for the Agency for Innovation, Belgium	2010	present
Reviewer of projects for the Defense Threat Reduction Agency	2010	present
Referee: <i>Science</i>	2010	present
Referee: <i>Nature</i>	2010	present
Member, Awards Committee of the International Symposium on Compound Semiconductors (ISCS)	2010	2014
Member, Program Committee and Chair of the High Frequency, High Power Subcommittee of the International Symposium on Compound Semiconductors (ISCS)	2010	2010
Founding-member, IEEE MTT Technical Committee on		

Nanoelectronics (MTT-25)	2009	present
Reviewer of projects for the European Science Foundation	2009	present
Reviewer of projects for the National Science Foundation (NSF)	2009	present
Member, Program Committee of the International Workshop on Nitride Semiconductors	2009	present
Advisory Chair, International Conference on Advances in Electronics and Micro-Electronics	2009	2012
Solid-State Device Research Conference (ESSDERC)	2008	present
Member, Technical Program Committee of the European	2008	present
Reviewer of projects for Spanish Ministry of Science	2008	present
Referee: <i>Applied Surface Science</i>	2008	present
Member, Program Committee of the International Conference On Advances in Electronics and Micro-Electronics	2008	2012
Member, Program Committee of the International Electron Device Meeting (IEDM)	2008	2009
Referee: <i>Journal of Crystal Growth</i>	2007	present
Referee: <i>Journal of Electronic Materials</i>	2007	present
Referee: <i>IEEE Solid State Electronics</i>	2007	present
Member, Technical Program Committee of the International Conference for Nitride Semiconductors (ICNS)	2007	present
For Nitride Semiconductors (ICNS-7), Las Vegas, NV		
Member, Program Committee of the Device Research Conference (DRC)	2007	2009
Publication co-Chair and Guest Editor, International Conference	2007	2008
Referee: <i>Applied Physics Letters</i>	2006	present
Referee: <i>Journal of Applied Physics</i>	2006	present
Referee: <i>IEEE Electron Device Letters</i>	2006	present
Referee: <i>IEEE Transactions on Electron Devices</i>	2006	present
Referee: <i>IEEE Electronic Letters</i>	2006	present
Session chair in numerous semiconductor conferences	2006	present
Referee: <i>Physica Status Solidi (a, b, c)</i>	2005	present

9. AWARDS RECEIVED:

<u>Award</u>	<u>Date</u>
First Award in the “Madrid Science Museum Competition”	1995
International award: “Prämienprogramm zur Forderung der Ausbildung ausländischer Schüler in der deutschen Sprache. Internationales Preisträgerprogramm,” awarded by the German Ministry of Education	1995
High School Extraordinary Award awarded by the Spanish Education Ministry to the best students in Spain	1996
Gold Medal at the Spanish Mathematical Olympiad	1996
Representative of Spain in the 37 th International Mathematical Olympiad held in Mumbai, India	1996
Representative of Spain in the International Summer Fellowship at the European Organization for Nuclear Research (CERN)	2000

Best Undergraduate EECS Student Award from the Polytechnic University of Madrid	2000
Best Master's Thesis Award from the Spanish Association of Telecommunication Engineers: "Nanotechnology for High Frequency Devices in III-N Nitrides: Applications to MSM UV-Detectors, SAW Filters and HEMT Transistors"	2002
Salva i Campillo, awarded by the Catalan Association of Telecommunication Engineers to the "most promising European newcomer to Engineering"	2003
Best Student Paper Award at the 63 rd IEEE Device Research Conference (Santa Barbara, USA), June 2005	2005
Young Researcher Award at the 6 th International Conference on Nitride Semiconductors (Bremen, Germany)	2005
Nominated by the IEEE for the 2006 and 2007 "New Faces of Engineering" Recognition Program	2005/06
UCSB Lancaster Award for "the best PhD Dissertation in Mathematics, Physical Sciences and Engineering at UCSB in the period 2004-2006"	2006
IEEE Electron Devices Society Masters Student Fellowship for "outstanding M.Sc. work" on electric field engineering of GaN HEMTs (Xu Zhao)	2007
DARPA Young Faculty Award	2008
Best Paper Award at the International Conference on Advances in Electronics and Microelectronics	2008
Office of Naval Research Young Investigator Award	2009
National Science Foundation (NSF) CAREER Award	2009
Best Paper Award at the 2010 Compound Semiconductors Manufacturing Technology (CS-ManTec) Conference	2010
Young Scientist Award at the 37 th International Symposium on Compound Semiconductors (Takamatsu, Japan)	2010
MIT Emmanuel Landsman Career Development Chair	2010
National Academy of Engineering's Frontiers of Engineering Fellow	2010
Distinguished Microwave Lecturer of the IEEE Microwave Theory and Techniques (MTT) Society	2011/13
Presidential Early Career Award for Scientists and Engineers (PECASE)	2011
Roger A. Haken Best Student Paper Award at the 2012 International Electron Devices Meeting (IEDM)	2012
IEEE Electron Devices Society George Smith Award for "The best paper appearing in a fast turnaround archival publication of the IEEE Electron Devices Society, targeted to IEEE Electron Devices Letters"	2013
Distinguished Citizen of Jaen (my hometown in Spain, one awardee per year)	2013
"Agustin de Betancourt" Award from the Spanish Royal Academy of Engineering, the most prestigious award given in Spain to an engineer less than 36 years old	2013
PhD Advisor of Dr. Han Wang, who received the Jin-Au Kong Doctoral Thesis Prize for the best EE-related PhD thesis in the EECS Department at MIT	2013
PhD Advisor of Dr. Bin Lu, who received the MTL Doctoral Dissertation Award at MIT	2013
Fellow of the Frontiers of Engineering Program (US-EU) of the National	2014

Academy of Engineering	
PhD advisor of Sameer Joglekar, who received the 2014 Best Poster Award at the International Workshop on Nitride Semiconductors	2014
Young Scientist Best Presentation Award from the Japan Society of Applied Physics	2014
PhD advisor of Allen Hsu, who received the 2014 MTL Doctoral Dissertation Award at MIT	2014
Ruth and Joel Spira Teaching Award	2015
Elevation of IEEE Fellow	2016
Appointment as Editor of IEEE Electron Device Letters	2016
Choiseul Ranking of top 100 “Economic Leaders for Tomorrow” in Spain	2017
PhD advisor of Sameer Joglekar, who received Best Student Paper Award: 2016 International Conference on Compound Semiconductor Manufacturing	2017
Manufacturing (CS-MANTECH)	2016
Thompson Reuters Highly Cited Researcher	2017
Selected for the Choiseul 2017 Ranking of top 100 “Economic Leaders for Tomorrow”	2017
NASA Group Achievement Award for the “Nanotechnology Incubator Team”	2017
Advisor to Ahmad Zubair, who received a 2018 Runner-up Best Student Paper Award at the 2018 Compound Semiconductor Week (CSW 2018)	2018
Selection as a Clarivate/Thompson Reuters Highly Cited Researcher	2018
Plenary speaker at the 2018 International Workshop on Nitride Semiconductors (IWN)	2018
Co-author in best student paper Award at the 2018 IEEE International Reliability Physics Symposium (IRPS)	2018
The oldest High School in Spain, IES Cardenal Cisneros, named its Technology Laboratory after me.	2018
Selection as a Clarivate/Thompson Reuters Highly Cited Researcher	2019
2020 Faculty Research Innovation Fellowship	2020
2019 Electron Devices Society George E. Smith Award	2020
Honorable Mention Award (ACM Conference) on Human Factors in Computing Systems (CHI) for the paper: “KnitUI: Fabricating Textile Sensor and User Interface with Machine Knitting”	2021
Recognition Award for Outstanding Service to IEEE Community during the organization of the 2020 IEEE Symposia on VLSI Technology and Circuits	2021
Highly Cited Researchers awarded by Clarivate	2021
“The Highly Cited 2021 Researchers list identifies researchers who produced multiple papers ranking in the top 1% by citations for their chosen field or fields and year of publication, demonstrating significant influence among their peers	
Intel’s Outstanding Researcher Award	2021
Fellow of the Fundacion Gadea, which recognizes some of the most important Spanish scientists and engineers	2022
Clarivate Highly Cited Researchers	2022

IEDM 2022 paper on Highly-Scaled GaN Complementary Technology on GaN-on-Si Platform has one of the ~10 papers (out of more than 200) selected for publication in IEEE Trans. of Electron Devices. 2022

Clarence J LeBel Professor Chair Award for Outstanding Research and Contribution July 2023

Samsung Annual Appreciation Award 2023

Clarivate Highly Cited Researcher 2023

Sharon Hsia... Best Student Paper Award at the International Conference on Nitride Semiconductors 2023, the top conference in the field of GaN materials and devices with around 1200 participants. 2023

John Niroula ... Best Student Paper Award at the International Conference on Nitride Semiconductors 2023, the top conference in the field of GaN materials and devices with around 1200 participants. 2023

Pradyot Yadav... Best Student Paper Award at the SRC JUMP 2.0 CHIMES Annual review (out of ~50 student papers). 2023

David Morales... Second Prize for Best MEng. Thesis Project in Biomedical Engineering in Spain 2023

10. CURRENT ORGANIZATION MEMBERSHIP:

<u>Organization</u>	<u>Offices Held</u>
American Physical Society (APS)	Member
Institute of Electrical and Electronics Engineers (IEEE)	Fellow
IEEE Electron Device Society (IEEE - EDS)	Fellow, Member
IEEE Microwave Theory and Techniques Society (IEEE – MTT)	Member, Nanotech. Subcommittee

11. PATENTS AND PATENT APPLICATIONS PENDING:

1. T. Palacios, L. Shen and U. K. Mishra, “Methods to Shape the Electric Field in Electron Devices, Passivate Dislocations and Point Defects, and Enhanced the Luminescence Efficiency of Optical Devices,” Application No. PCT/US2006/044362, May 2007.
2. L. S. McCarthy, U. K. Mishra, F. Recht, and T. Palacios, “Method to fabricate III-N field effect transistors using ion implantation with reduced dopant activation and damage recovering temperature,” Application No. PCT/US2008/003139, September 2008.
3. T. Palacios and J. W. Chung, “HEMTs Based On Si/Nitride Structures,” Application No. PCT/US2008/060200, October 2008.
4. T. Palacios, M. H. Wong, S. Rajan and U. K. Mishra, “Polarization-induced barriers for N-face nitride-based electronics,” Application No. PCT/US2008/064906, December 2008.
5. T. Palacios, “Improving the Performance of Nitride Semiconductors Devices,” Application No. 2014-535875, June 2011.
6. J.W. Chung and T. Palacios, “Devices Based on SI/Nitride Structures,” Patent No. 8188459, May 29, 2012.

7. Y. Zhang, T. Palacios, "Structure and Process Technology for High Linearity in GaN Transistors," Application No. 14/284135, February 2013.
8. B. Lu and T. Palacios, "Dual Gate Normally-Off Nitride Transistors," Patent No. 8587031, November 19, 2013.
9. Wang, Han, Yu, Lili, and T. Palacios, "Process and Apparatus for Fabrication of Layer Materials and Devices," Application No. P201331701, November 2013.
10. J. W. Chung, H. Wang, and T. Palacios "Fabrication Technique For Gallium Nitride Substrates," Patent No. 8703623, April, 22, 2014.
11. D. Chen, F. Gao, B. Lu and T. Palacios, "Vertical Nitride Semiconductor Device with Conductive Buffer Layers," Application No. 14/396507, May 2014.
12. B. Lu and T. Palacios, "Enhancement-Mode Nitride Transistor," Patent No. 8759876, June 24, 2014.
13. T. Fujishima and T. Palacios, "Aluminum Nitride Based Semiconductor Devices," Application No. 14/367385, June 2014.
14. T. A. B. Mojena, F.C. Gomez, J.M. Rodrigo, T. Palacios and J.P. Ayala, "New Structures for GaN Vertical Transistors," Application No. PCT/ES2014/070859, June 2014.
15. Y. Zhang and T. Palacios, "Dielectric Technology for Nitride Semiconductor Devices," Application No. 62/056724, September 2014.
16. D. Chen, F. Gao, B. Lu and T. Palacios, "Passivation Technique for Wide Bandgap Semiconductor Devices," Application No. 14/396507, October 2014.
17. L. Yu, H. Wang, T. Palacios, "Graphene-MOS2 Hybrid Technology for Large-Scale Two Dimensional Electronics," Application No. PCT/US2014/063903, November 2014.
18. T. Palacios, "Process and Apparatus for Fabrication of Layer Materials and Devices," Application No. PCT/ES2014/070859, November 2014.
19. J.W. Chung and T. Palacios, "High-performance Nitride Semiconductor Devices," Patent No. 8921892, December 30, 2014.
20. B. Lu, M. Sun, and T. Palacios, "Vertical Nitride Semiconductor Device," Application No. 14/662837, March 2015.
21. B. Lu, E. Matioli and T. Palacios, "Semiconductor Devices Having a Recessed Electrode Structure," Patent No. 9041003, May 26, 2015.
22. B. Lu, M. Sun, and T. Palacios, "Semiconductor Structure and Recess Formation Etch Technique," Application No. 14/442546, May 2015.
23. Bin Lu, Elison Matioli, and Tomas Palacios, "Diode Having Trenches in a Semiconductor Region" Patent # 9393538, March 2016.
24. Tatsuya Fujishima, and Tomas Palacios, "Aluminum Nitride Based Semiconductor Devices" Patent# 9337301, May 2016.
25. T. Palacios, H. Wang, L. Yu, "Electronics Including Graphene-Based Hybrid Structures," Application No. 16686, Serial#15/034051, Patent Cooperation Treaty, Patent Application Pending filed, May 2016.

26. U. Radhakrishna, S. Joglekar, and T. Palacios, "New Technology to Increase Transistor Linearity" Patent Application Pending, December 2016.
27. D. S. Lee, T. Palacios, "Improving Linearity in Semiconductor Devices," Application No. PCT/US2014/019520, February 2014. US Patent No: 97/11594, 7/18/2017.
28. M. Dresselhaus, J.Kong, Y. Lin, X. Ling, T. Palacios, "Universal Methodology to Synthesize Diverse Two-Dimensional Heterostructures," Application No. 18252, Serial#15/373687, Utility Patent 9812525 B2.
29. F Gao, D Chen, B Lu, TA Palacios - , "Passivation technique for wide bandgap semiconductor devices," US Patent 9,634,111, 2017
30. Yuhao Zhang, and T. Palacios, "Enhancement-Mode Transistors with Increased Threshold Voltage," US 9704959, 2017.
31. B Lu, M. Sun, TA Palacios, "Structures for nitride vertical transistors," U.S. Patent Application No.: 15/388,963, 2017
32. E de Nazareth Matioli, TA Palacios, "Reducing leakage current in semiconductor devices," US Patent 9,911,813, 2018
33. TA Palacios, S Jayanta-Joglekar, U Radhakrishna, "High-linearity transistors," US Patent App. 15/849,219, 2018, *Pending*
34. RM Radway, TA Palacios, "GaN devices fabricated via wafer bonding," US Patent App. 15/489,083, *Pending*
35. GaN-based CMOS Logic on a Si Substrate - by Elaine McVay, and Tomas Palacios - Patent disclosure submitted to TLO on 3/4/2019
36. Efficient Charge Transfer Doping Technology for P-Type GaN - by Nadim Chowdhury and Tomas Palacios - Patent disclosure submitted to TLO on 4/4/2019
37. CE Mackin, TA Palacios, "Sensor systems and related fabrication techniques," US Patent App. 15/773,247, 2018, US Patent No: 15/773247, 11/8/2018
38. M. Sun, TA Palacios, "Structures for nitride vertical transistors," U.S. Patent Application No.: 15/388,963, US Patent No: 10/256352, 4/9/2019.
39. Tomas Apostol Palacios, Sameer Jayanta-Joglekar, Ujwal Radhakrishna, "High-linearity transistors," US Patent office no. 10/439059, Application number 15849219, 8/10/2019.
40. Y. Lin, X. Ji, J. Kong, T. Palacios, "Ultrasensitive thermo-mechanical bolometer," US Patent office no. 16/449410, 12/16/2019
41. W. Gallagher, Hpstaken, M., Lee, K-T, Palacios, T. Piedra, D. Sadana, D., "Control of Current Collapse in Thin Pattern GaN," US Patent office No. 16/219300, 1/23/2020.
42. Bin Lu, Tomas Palacios, Ling Xia, Mohamed Azize, "Transistor structure having buried island regions," Patent office no. 10566192, 2/18/2020.
43. SEMICONDUCTOR DEVICE WITH ELECTRIC FIELD MANAGEMENT STRUCTURES Invention disclosure: FinFETs with Inter-Fin Ion Implantation Invention disclosure: Improved Contacts in Vertical Transistors Invention disclosure: Low-

temperature synthesis of two dimensional materials Invention disclosure: High Aspect Ratio Fin/Trench Technology (2022)

12. PROFESSIONAL REGISTRATION:

None

13. MAJOR NEW PRODUCTS, PROCESSES, DESIGNS, OR SYSTEMS:

Most of the patents in section 11 have been licensed to semiconductor companies and they are being used in commercial products. For example, Finwave Semiconductor has recently announced commercial GaN-based RF and power transistors based on some of the technologies originally developed at MIT by Palacios's group. More information can be found in Finwave's website: <http://finwavesemi.com>

10. BOOKS

11. PUBLICATIONS

- Aklimi, E., Piedra, D., Tien, K., Palacios, T., & Shepard, K. (2017). Hybrid CMOS/GaN 40-MHz Maximum 20-V Input DC-DC Multiphase Buck Converter. *IEEE JOURNAL OF SOLID-STATE CIRCUITS*, 52(6), 1618–1627. <https://doi.org/10.1109/JSSC.2017.2672986>
- Amano, H., Baines, Y., Beam, E., Borga, M., Bouchet, T., Chalker, P., Charles, M., Chen, K., Chowdhury, N., Chu, R., De Santi, C., De Souza, M., Decoutere, S., Di Cioccio, L., Eckardt, B., Egawa, T., Fay, P., Freedman, J., Guido, L., Häberlen, O., Haynes, G., Heckel, T., Hemakumara, D., Houston, P., Hu, J., Hua, M., Huang, Q., Huang, A., Jiang, S., Kawai, H., Kinzer, D., Kuball, M., Kumar, A., Lee, K., Li, X., Marcon, D., März, M., McCarthy, R., Meneghesso, G., Meneghini, M., Morvan, E., Nakajima, A., Narayanan, E., Oliver, S., Palacios, T., Piedra, D., Plissonnier, M., Reddy, R., Sun, M., Thayne, I., Torres, A., Trivellin, N., Uren, M., Van Hove, M., Wallis, D., Wang, J., Xie, J., Yagi, S., Yang, S., Youtsey, C., Yu, R., Zaroni, E., Zeltner, S., Zhang, Y. (2018). The 2018 GaN power electronics roadmap. *JOURNAL OF PHYSICS D-APPLIED PHYSICS*, 51(16). <https://doi.org/10.1088/1361-6463/aaaf9d>
- Araghchini, M., Chen, J., Vicky, D., Harburg, D., Jin, D., Kim, J., Kim, M., Lim, S., Lu, B., Piedra, D., Qiu, J., Ranson, J., Sun, M., Yu, X., Yun, H., Allen, M., del Alamo, J., DesGroseilliers, G., Herrault, F., Lang, J., Levey, C., Murray, C., Otten, D., Palacios, T., Perreault, D., Sullivan, C. (2013). A Technology Overview of the PowerChip Development Program. *IEEE TRANSACTIONS ON POWER ELECTRONICS*, 28(9), 4182–4201. <https://doi.org/10.1109/TPEL.2013.2237791>
- Araki, T., Uchimura, S., Sakaguchi, J., Nanishi, Y., Fujishima, T., Hsu, A., Kim, K., Palacios, T., Pesquera, A., Centeno, A., & Zurutuza, A. (2014). Radio-frequency plasma-excited molecular beam epitaxy growth of GaN on graphene/Si(100) substrates. *APPLIED PHYSICS EXPRESS*, 7(7). <https://doi.org/10.7567/APEX.7.071001>
- Asadi, R., Zheng, T., Shih, P., Palacios, T., Akinwande, A., & Gnade, B. (2024). Degradation of GaN field emitter arrays induced by O₂ exposure. *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B*, 42(1). <https://doi.org/10.1116/6.0003314>
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- Zhang, Y., Sun, M., Piedra, D., Hu, J., Liu, Z., Lin, Y., Gao, X., Shepard, K., Palacios, T., & IEEE. (2017). 1200 V GaN Vertical Fin Power Field-Effect Transistors (WOS:000424868900051). 2017 IEEE INTERNATIONAL ELECTRON DEVICES MEETING (IEDM).
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- Zhang, Y., Wong, H., Sun, M., Joglekar, S., Yu, L., Braga, N., Mickevicius, R., Palacios, T., & IEEE. (2015). Design Space and Origin of Off-State Leakage in GaN Vertical Power Diodes (WOS:000380472500224). 2015 IEEE INTERNATIONAL ELECTRON DEVICES MEETING (IEDM).
- Zhang, Y., Yuan, M., Chowdhury, N., Cheng, K., & Palacios, T. (2018). 720-V/0.35-mΩ•cm² Fully Vertical GaN-on-Si Power Diodes by Selective Removal of Si Substrates and Buffer Layers. *IEEE ELECTRON DEVICE LETTERS*, 39(5), 715–718. <https://doi.org/10.1109/LED.2018.2819642>
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12. INVITED LECTURES

- [1] September 2005, ISOM, Universidad Politécnica de Madrid, Madrid, Spain.
- [2] September 2005, Walter Schottky Institute, Technical University of Munich, Munich, Germany.
- [3] March 2007, “Nitride Electronics: New Ideas at the mm-wave Frontier,” Tufts University, Medford, MA; also at University of Notre Dame, Notre Dame, IN; and CEA-Grenoble, Grenoble, France.
- [4] July 2007, “Nitride Electronics: The Power of Polarization,” M/A-COM Electronics, Lowell, MA.
- [5] August 2007, “Nitride Electronics: The Power of Polarization,” TriQuint Electronics, Dallas, TX; also at NEC, Kyoto, Japan; Toyota Central Research Laboratories, Nagoya, Japan; and Hitachi Electric, Tokyo, Japan.
- [6] September 2007, “Nitride Electronics: New Ideas at the mm-wave Frontier,” Northrop Grumman Corporation, Baltimore, MD.
- [7] July 2008, “GaN Electronics,” OptoSchool Summer School 2008, Mumbai, India.
- [8] February 2009, “GaN Transistors: Redefining the Limits of Electronics,” M/A-COM Electronics, Lovell, MA.
- [9] September 2009, “Heterogeneous Integration with Si, the Next Frontier for Electronics,” Yale University, New Haven, CT.
- [10] May 2010, “GaN Power Electronics,” National Semiconductors, Santa Clara, CA.
- [11] August 2010, “GaN Power Electronics,” Analog Devices, Wilmington, MA.
- [12] July 2011, “Graphene-based Electronics for RF Communications and Sensing,” University of Aveiro, Aveiro, Portugal. IEEE Distinguished Microwave Lecture.
- [13] August 2011, “Graphene-based Electronics for RF Communications and Sensing,” DNP, Tokyo, Japan.
- [14] August 2011, “GaN Transistors: Revolutionizing Electronics from THz to KV,” Sumitomo Electric, Tokyo, Japan.
- [15] September 2011, “GaN Transistors: Revolutionizing Electronics from THz to KV,” ROHM Co., Kyoto, Japan.
- [16] September 2011, “Graphene-based Electronics for RF Communications and Sensing,” Panasonic, Nagoya, Japan.
- [17] September 2011, “GaN Transistors: Revolutionizing Electronics from THz to KV,” Fujitsu Laboratories, Yokohama, Japan.
- [18] September 2011, “GaN Power Electronics,” Army Research Laboratory – Fellow Symposium, Baltimore, MD.
- [19] October 2011, “Graphene-based Electronics for RF Communications and Sensing,” University of Michigan, Ann Arbor, MI. IEEE Distinguished Microwave Lecture.
- [20] October 2011, “GaN Power Electronics,” Texas Instruments - Fellow Conference, Dallas, TX.
- [21] February 2012, “Graphene-based Electronics for RF Communications and Sensing,” University of Southern California, Los Angeles, CA. IEEE Distinguished Microwave Lecture.
- [22] February 2012, “Graphene-based Electronics for RF Communications and Sensing,” Chalmers University, Gothenburg, Sweden. IEEE Distinguished Microwave Lecture.

- [23] February 2012, “GaN Electronics for Sub-mm Wave Applications,” Symposium of the National Nanotechnology Infrastructure Network, University of California, Santa Barbara, CA.
- [24] October 2012, “Atom-Thick Materials for the Next Revolution in Electronics,” Physics Colloquium, Harvard University, Cambridge, MA.
- [25] October 2012, “Atom-Thick Materials for the Next Revolution in Electronics,” MTT Distinguished Seminar, Dallas, TX.
- [26] November 2012, “GaN and Graphene – Extreme Materials for Advanced Electronics,” Cornell University, Ithaca, NY.
- [27] November 2012, “Graphene Based Analog Devices,” ITRS Workshop, Webinar.
- [28] January 2013, “Graphene and other 2D materials: New Opportunities in Flatland,” MIT-Japan ILP Conference, Tokyo, Japan
- [29] September 2013, “GaN and 2D Materials: Extreme Materials for Extreme Frequencies,” International Microwave Symposium, Seattle, WA.
- [30] September 2013, “The Impact of Graphene: What is Next after the Hype?,” IPC Technology Market Research Conference, Chicago, IL.
- [31] April 2014, "2D Semiconductors: From Devices to Systems," Applied Materials, Santa Clara, CA.
- [32] October 2014, "Atom-thick Materials for the Next Revolution in Electronics," Applied Physics Laboratory Symposium, John Hopkins University, Baltimore, MD.
- [33] January 2015, "Atom-thick Materials for the Next Revolution in Electronics," IMDEA Nanociencia, Madrid, Spain.
- [34] May 2015, "Recent Progress on Electronic Systems Based on 2-Dimensional Materials," Army Research Laboratory, Adelphi, MD.
- [35] June 2015, "The Future of Microsystems," Polytechnic University of Madrid, Spain.
- [36] June 2015, "Atom-thick Materials for the Next Revolution in Electronics," Instituto de Ingenieria de España, Madrid, Spain.
- [37] Feb. 2016, T. Palacios, “How Integration will Enable the Light Bulb of the Future,” Solid State Lighting Symposium, Raleigh, NC (Invited talk)
- [38] Feb. 2016, T. Palacios, “System-level Applications of Two-Dimensional Materials: Challenges and Opportunities,” Princeton University, (Invited talk).
- [39] April 2016, T. Palacios, “GaN and Graphene: Extreme Materials for the Future of Electronics,” MIT Spain Club, MIT, (Invited Talk).
- [40] April 2016, T. Palacios, “System-Level Applications of Two Dimensional Materials,” Graphene 2016, Genova Italy (Invited talk).
- [41] June 2016, T. Palacios, “Redefining Electronics: System-Level Applications of 2D Materials,” Fundación Ramon Areces, Madrid, (Invited talk).
- [42] Aug. 2016, T. Palacios, “New Materials to Push the Limits of Moore’s Law,” Lester Eastman Conference, August 2016. (Invited talk).
- [43] Nov. 2016, M. Sun, Y. Zhang, and T. Palacios, “Vertical GaN Transistors for the Next Generation of Power Electronics,” WiPDA (Keynote/Plenary talk).
- [44] Nov. 2016, Y. Zhang, M. Sun, and T. Palacios, “Low-cost and High-performance Vertical GaN Diodes and Transistors for Power Electronics,” IFWS, Beijing, China, (Invited talk).
- [45] Feb. 2017, M. Sun, Y. Zhang, M. Pan, X. Gao, and T. Palacios, “Vertical GaN transistors for power electronics,” SPIE Photonics West Conference, San Francisco, CA.

- [46] May 2017, T. Palacios, “High-voltage vertical GaN pn diodes on Si”, Compound Semiconductor Week 2017 (44th International Symposium on Compound Semiconductors), Berlin, Germany.
- [47] July 2017, T. Palacios, “Redefining Electronics: System-level Applications of 2D Materials,” 1st International Workshop on 2D Atomic Sheets, organized in Washington DC.
- [48] Oct. 2017 Palacios, “Nanostructured GaN Transistors,” 39th IEEE Compound Semiconductor IC (CSIC) Symposium, Miami, FL. (Plenary Talk).
- [49] July 2017, M. Sun...T. Palacios, “Vertical GaN Electronics,” International Conf. on Nitride Semiconductors 2017, Strasbourg, France.
- [50] Sept. 2017, T. Palacios, “Graphene Electronics (or how to reinvent engineering with extreme materials),” Solvay Workshop on “Physics of Graphene and Graphene for Physics,” Brussels, Belgium.
- [51] Jan 2018, T. Palacios, “GaN Nanoelectronics,” UKNC Winter Conference 2018, Manchester, GB.
- [52] Mar. 2018, T. Palacios, “Gallium Nitride: Extreme Properties (and Opportunities) for Post-Moore Computing,” APS March Meeting 2018 Los Angeles, California.
- [53] Apr. 2018, T. Palacios, “Fin-based GaN RF and Power Devices,” GaN Marathon 2.0 Padova, Italy.
- [54] June 2018, T. Palacios, “2D Materials for Hardware Accelerators in More-than-Moore Electronics,” Gordon Research Conference, Frontiers of Science, Stonehill College, Easton, MA, USA.
- [55] June 2018, X. Zhang, T. Palacios, “MoS₂ Phase-Junction-Based Schottky Diodes for RF Electronics,” International Microwave Symposium, Philadelphia, PA.
- [56] Aug 2018, T. Palacios, “GaN Nanostructures (or how to Take Transistor Linearity to new Levels),” International Symposium on Growth of III-Nitrides ISGN-7, Warsaw, Poland.
- [57] Sept. 2018, T. Palacios, “Novel Vertical GaN Power Devices,” SSDM2018 (International Conference on Solid State Devices and Materials) University of Tokyo, Tokyo, Japan.
- [58] Sept. 2018, T. Palacios, “Gallium nitride, graphene and the new computing revolution,” 12 Spanish Conference on Electron Devices, Salamanca, Spain (Invited Talk).
- [59] Nov. 2018, T. Palacios, “Gallium Nitride and the New Computer Revolution,” IWN 2018, Kanazawa, Japan (Invited Talk).
- [60] Jan. 2019, T. Palacios, “Gallium Nitride, Graphene and the Next Computing Revolution,” Hong Kong University of Science and Technology, Hong Kong (Invited talk).
- [61] Feb. 2019, T. Palacios, “The Graphene Revolution: From electronics to synthetic cells,” Graphene-for-US Conference, New York City, NY. (Plenary talk).
- [62] June 2019, Nadim Chowdhury, Ahmad Zubair, Joshua Perozek, Qingyun Xie and Tomas Palacios, “GaN for 5G Applications: FinFETs, CMOS and Vertical Transistors,” International Microwave Symposium, Boston, MA (Invited Talk).
- [63] June 2019, T. Palacios, “GaN Devices for Space Applications,” Jet Propulsion Laboratory, Pasadena, CA. (Invited talk).
- [64] Aug. 2019, Xu Zhang and Tomas Palacios, “Two-dimensional MoS₂-enabled Flexible Rectenna for Wireless Energy Harvesting in the Wi-Fi band,” SPIE Optics + Photonics, Nanoscience + Engineering 2019, San Diego, CA (Invited talk).

- [65] Aug. 2019 T. Palacios, "Vertical GaN Nanostructures for RF and Power Electronics" Topical Workshop on Heterostructure Microelectronics 2019 (TWHM 2019) Toyama, Japan (Invited talk).
- [66] Sept. 2019, T. Palacios, "The Graphene Revolution: From Transistors to Synthetic Cells," Graphene Week, Helsinki, Finland, Sept. 23, 2019 (Plenary/Keynote talk).
- [67] Oct. 2019, T. Palacios, "From Flexible Electronics to Synthetic Cells: The Unique Opportunities of 2D Materials," Air Force Research Laboratory, Dayton, OH (Invited Talk).
- [68] June 2020, T. Palacios, P. Shih et al., "GaN Nanowire Field Emitters with a Self-Aligned Gate Process," 2020 Device Research Conference (DRC), Columbus, OH, USA, 2020 (Invited Talk).
- [69] June 2020, G. bur, J Zhao, L Jain, A Zubair, T Palacios, J Kong, AI Akinwande, "Enabling Atmospheric Operation of Nanoscale Vacuum Channel Transistors," 2020 Device Research Conference (DRC), (2020).
- [70] June 2020, A Zubair, J Perozek, J Niroula, O Aktas, V Odnoblyudov, T Palacios, "First Demonstration of GaN Vertical Power FinFETs on Engineered Substrate," Device Research Conference (DRC), Columbus, OH, USA, 2020 (Invited Talk).
- [71] T. Palacios, "GaN For High Temperature Operation," Workshop fundamental limits of GaN (and related III-N) electronics technology, DARPA, Sept. 28th, 2021
- [72] T. Palacios, "Extreme Semiconductors: The Critical Infrastructure to Build a Sustainable Future," Annual meeting of the Semiconductor and Electronics Industries in the Philippines Foundation, Inc., Nov. 23rd, 2021 (Invited speaker)
- [73] T. Palacios, "Materials and Devices for Edge Computing: Data to Decision," Army Research Laboratory, August 10th, 2021 (Invited speaker)
- [74] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," University of California - Berkeley, April 30th, 2021 (Invited speaker)
- [75] T. Palacios, "The Future of Semiconductor Research," Universidad Politecnica de Madrid (Spain), Feb. 10, 2021 (Invited speaker)
- [76] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," Naval Research Laboratory, April 7th, 2021 (Invited speaker)
- [77] T. Palacios, "GaN 2.0: A Breakthrough Semiconductor for RF, Power and Space," Ohio State University, April 15th, 2021 (invited speaker)
- [78] T. Palacios, "2D Materials: The Key towards Ubiquitous Intelligence," PolyU 85th Anniversary FAST Workshop Series on Two-dimensional Materials and Devices, March 24-25, 2022 (Invited speaker)
- [79] T. Palacios, "Extreme Materials to Enable New Form-Factors in Electronics," Integrated Cognitive and Autonomous Multi-Sensor Systems Workshop, Texas A&M, April 14, 2022 (Invited speaker)
- [80] T. Palacios, "The Superpowers of New Materials," TEDx-MIT, April 23, 2022 (Invited speaker)
- [81] T. Palacios, "Unlocking the Next Generation of Chip Materials, Technology Review's Future of Compute, May 3-4, 2022 (Invited speaker)
- [82] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," University of Michigan - Ann Arbor, May 6th, 2022 (Invited speaker)

- [83] T. Palacios, "2D Nanoelectronics: New Materials and Devices for Edge Intelligence," 2022 IEEE Microelectronics Design and Test Symposium (MDTS), May 23-26, 2022 (Invited speaker)
- [84] T. Palacios, "2D Materials: The Critical Infrastructure for the Future of Technology," Graphene 2022, July 5-7, 2022. (Invited speaker)
- [85] T. Palacios, "MoS₂ Transistors for Silicon Back-end-of-line Integration," Advanced Metallization Conference ADMETA, October 13-14, 2022 (Invited speaker)
- [86] T. Palacios, "MoS₂ Transistors for Back-End-of-the-Line Si Integration," MRS Fall Meeting, November 30, 2022 (Invited speaker)
- [87] T. Palacios, "Zero-Energy Devices: Technology and Applications of Ubiquitous 6G Systems," MIT Industrial Liaison Program Conference, November 14th, 2022 (Invited speaker)
- [88] T. Palacios, "Zero-Energy Devices: Technology and Applications of Ubiquitous 6G Systems," 6G Standardization meeting, November 30th, 2022 (Invited speaker)
- [89] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," University of Pennsylvania, December 14th, 2022 (Invited speaker)
- [90] T. Palacios, "GaN CMOS, MoS₂ Chiplets and Other Hardware Accelerators for the Future of Electronics," 15th International Symposium on Advanced Plasma Science and its Applications for Nitrides and Nanomaterials, ISPlasma 2023, Gifu, Japan March 5-9, 2023.
- [91] T. Palacios, "Graphene and MoS₂: Pushing the Limits of Electronics Through Heterogeneous Integration," 2023 International VLSI Symposium on Technology, Systems and Applications (VLSI TSA), Hsinchu, Taiwan, April 17-20, 2023.
- [92] T. Palacios, "Presente y Futuro de la Micro- y Nanotecnología," Talk at the 75th Anniversary of the Invention of the Transistor, Centro Nacional de Microelectrónica, Barcelona, Spain, June 2, 2023. (virtual)
- [93] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," Universidad Politécnica de Madrid, Madrid, Spain, July 6, 2023.
- [94] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," DARPA MEC, Needham, MA, August 1, 2023.
- [95] John Niroula, Mengyang Yuan, Qingyun Xie, Nitul S. Rajput, Kai Fu, Sagar Kumar Das, Abdullah Jubair Bin Iqbal, Bejoy Sikder, Mohamed Fadil Isamotu, Minsik Oh, Savannah R. Eisner, Debbie G. Senesky, Hary W. Hunter, Nadim Chowdhury, Yuji Zhao, and Tomas Palacios, "Enhancement-Mode GaN Transistor Technology for Venus Environmental Operation," Venus Exploration Analysis Group Conference, VEXAG 2023.
- [96] T. Palacios, "Electronics 5.0: New Materials and Devices for Edge Intelligence," Brookhaven National Laboratory, Brookhaven, CT, November 2, 2023.
- [97] Christian E. Lopez Angeles, Yiyue Luo, David Morales Loro, Jiadi Zhu, Mantian Xue, Wojciech Matusik, Jing Kong, and Tom's Palacios, "Heterogeneous

Integration of 2D Sensors for Wearable and Healthcare Applications,” Fall Meeting of the Materials Research Society (MRS), Boston, MA, December 2023. (Invited talk)

[98] Jiadi Zhu, Ji-Hoon Park, Jing Kong, and Tomás Palacios, “Low- Thermal-Budget Synthesis of MoS₂ on 8” wafers for BEOL and FEOL Transistors,” Fall Meeting of the Materials Research Society (MRS), Boston, MA, December 2023. (Invited talk)

[99] John Niroula, Mengyang Yuan, Qingyun Xie, and Tomas Palacios, “III-Nitride Electronics for Extreme Environment Operation,” International Conference on Nitride Semiconductors, Fukuoka, Japan, November 12-17, 2023 (Invited talk).

13. THESIS ADVISOR AND POST GRADUATE SCHOLAR SUPPORT:

1. Students (graduated): 20 (Ph.D. since 2012) and 9 (M.S)
2. Post graduate: 14 (Supported)
3. Graduate (Ph.D.) students currently supported (15): J. Zhu, J. Niroula, J. Perozek, K. Limanta, M. Xue, P. Shih, Q. Xie, S. Hsia, Y. Luo, P. Yadav, H. W. Lee., D. Morales, M. Oh, H. Pal. C. Lopez.
4. Undergraduate students currently supported: 5

Doctoral and SM students:

1. Patrick Kanan Darmawi-Iskandar, Ph.D. EECS
2. Joshua Perozek, Ph.D. EECS
3. Qingyun Xie, Ph.D., EECS (graduated in December 2023)
4. Sharon Hsia, SM., EECS
5. Jiadi Zhu, EECS, SM
6. Gillian Micale, DMSE, PhD
7. John Niroula, Ph.D., EECS,
8. Aijia Yao, Ph.D., EECS
9. Pradyot Yadav
10. Hae Won Lee
11. Ayush Gupta
12. Christian Lopez
13. Minsik Oh
14. Yixuan Jiao
15. Yiyue (Alyssa) Luo, EECS, CSAIL (supervisor Prof. Wojciech Matusik)
16. Hridibrata Pal
17. Pao-Chuan Shih, Ph.D., EECS (graduated in June 2023)
18. Kevin Limanta, Ph.D., EECS

Doctoral students, as reader:

1. Christian Lau, (Thesis supervisor: Prof. Max Shulaker)
2. Emre Ergecen (Thesis supervisor: Nuh Gedik)
3. Morgan Blevins (Thesis supervisor: Svetlana Boriskina)
4. Rana ElKashlan (PhD Student at imec, Belgium)
5. Nedeljko Jastrzebska-Perfect (Thesis supervisor: Tayo Akinwande)
6. Jeremy Gillbanks (PhD Student at University of Western Australia)

MEng students:

- David Morales (Visiting student from Spain who worked on his MEng thesis while in my group)

UROPs and SuperUROPs:

1. Deniz I. Erus (EECS, Super UROP)
2. Franck N. Belemkoabga (EECS, Super UROP)
3. James Greer (EECS, UROP)
4. Nishat Protyasha (EECS, SuperUROP)
5. Neelambar Mondal (EECS, UROP)
6. Lee (Amelie) Caceres (EECS, UROP)
7. Makar Kuznietsov (EECS, UROP)
8. Ezekie Daye (EECS, UROP)
9. Hasan Zeiki Yildiz (EECS, UROP)
10. Rachal (Can) Jiang (EECS, UROP)
11. Ellie Bultena (EECS, UROP)
12. Jeewoo Kang (EECS, UROP)

Accomplishments of research supervisees:

1. Sharon Hsia... Best Student Paper Award at the International Conference on Nitride Semiconductors 2023, the top conference in the field of GaN materials and devices with around 1200 participants.\
2. John Niroula ... Best Student Paper Award at the International Conference on Nitride Semiconductors 2023, the top conference in the field of GaN materials and devices with around 1200 participants.
3. Pradyot Yadav... Best Student Paper Award at the SRC JUMP 2.0 CHIMES Annual review (out of ~50 student papers).
4. David Morales... Second Prize for Best MEng. Thesis Project in Biomedical Engineering in Spain
5. Qingyun Xie, Ph.D., EECS ... Secured full time job at the Institute for Microelectronics in Singapore
6. Pao-Chuan Shih, Ph.D., EECS... Secured full time job at TSMC
7. Elaine McVay graduated and became a postdoc at Lawrence Livermore National Laboratory.
8. Nadim Chowdhury graduated and became a professor at Bangladesh University of Engineering and Technology (BUET). Nadim's thesis was also selected for the 2022 MTL Doctoral Dissertation Seminar (DDS).
9. Mengyang Yuan graduated and joined Apple full time.

Supervised theses:

1. Qingyun Xie, Ph.D., EECS
2. Sharon Hsia, SM., EECS
3. Pao-Chuan Shih, Ph.D., EECS

Service to EECS:

- This year I stopped being Industry Officer for the Department, however I continued to help for a few months to ensure a smooth transition.
- Member of the graduate student admissions committee.
- Member of the DMSE-SCC Joint Faculty Search Committee.

Service to labs:

- Director of the Microsystems Technology Laboratories (since Dec. 2022)
- Chair of the Electron Beam Lithography Committee of MIT.nano (Dec. 2019-present)
- Chair of the Fab.nano Faculty Advocates Group
- Director of the MTL Center for Graphene Devices and Systems.

Service to MIT:

- Member of the MIT Committee on the Undergraduate Program (CUP) (January to June 2023)

Service to outside of MIT:

- Member of the Steering Committee for the Indium Phosphide and Related Materials Conference, an annual International conference with ~400 attendees.
- Member of the IEEE Education Award Committee in the Electron Device Society
- Director of Knowledge Transfer (NSF-Science and Technology Center of Integrated Quantum Materials)
- Chair of the GaN Technical Program Committee of the 2023 International Symposium on Power Semiconductor Devices and IC's
- Member of the Technical Program Committee of several international conferences, including the International Workshop on Compound Semiconductors, the International Electron Device Meeting, the International Symposium on Power Semiconductor Devices and IC's, and the International Conference on Nitride Semiconductors.
- Reviewer for several research proposals from the AFOSR and ARO.
- Member of the SRC Microelectronic and Advanced Packaging Technologies (MAPT) Roadmap
- Member of the Editorial Board of the *physica status solidi* journal

14. TEACHING CONTRIBUTIONS:

1. Teaching materials developed that illustrate teaching effectiveness or innovativeness:
 - i. Design and teaching of a new Advanced Undergraduate Senior (AUS) level course on semiconductor device physics (6.077).

- ii. Development of material to teach, for the first time, device simulation CAD in 6.720.
- iii. Development of new homework and lecture content for 6.772.
- iv. Development of new assignment, lectures, recitations notes, and the new transistor lab for 6.012
- v. Development of new labs and homeworks for 6.002.
- vi. Development of material to bring a hardware-EE perspective for 6.02 recitations. This helped to compensate the Python/software-heavy lectures and labs.
- vii. Added numerous active-learning activities for 6.02 such as creating student groups where students help engage and collaborate ideas among their peers.

2. Education contributions, apart from classroom performance and supervision, such as new educational programs and curricula developed by the candidate:

- i. Development of numerous activities (seminars, panels, mock interviews, mock job talks, mailing lists, etc.) to help senior graduate students to apply for faculty positions (2007-present).
- ii. Participation in several events to introduce undergraduate students to course VI (e.g. “*Introducing Course 6 to Freshmen MIT students,*” MacGregor House, November 15th, 2007).
- iii. Organizer of a seminar series on advanced nitride materials and devices (~12 talks) (2006-present).
- iv. Chair of the MTL Seminar Series (2009-2015).
- v. Director of 6A Program (MIT EECS co-op MEng program) since July 2015.
- vi. Director of the EECS Alliance program since July 2020. This program develops new initiatives to connect MIT students with industry.

3. Contributions to the educational commons and Lecturer:

- i. Reading admission folders of graduate students in course VI (2008-present).
- ii. Reading admission folders of undergraduate students (2011-2012).
- iii. Member of the advisory committee of the MIT-Spain MISTI program (2007-2008).
- iv. Arrange summer internships in Spain for more than 10 MIT undergraduate students (2009).
- v. Collaboration with the MIT-France program by hosting French visiting students (2007-2010).
- vi. UROP/Super-UROP supervisor (2008-present).
- (1) ing students in the MIT Leaders for Global Operations (LGO) program (2011-present).
- vii. Faculty Lead, MIT/Masdar Institute Microsystems program.
- viii. Lecturer for 6.002 and 6.012
- ix. Recitation Instructor for 6.02 and 6.012
- x. Course 6.2000 – roles (Fall 2022)
I co-lectured 6.2000 with Prof. Jeff Lang.
- xi. Course 6.3100/2 – roles (Fall 2022)
6 h of lab proctoring/teaching per week
- xii. Course 6.2000 – roles (Fall 2023)

I co-lectured 6.2000 with Prof. Jeff Lang Electrical Circuits: Modeling and Design of Physical Systems
6 h of lab proctoring/teaching per week
xiii. Recitation Instructor for 6.02 – roles (Fall 2023)

Number of EECS undergrad and MEng advisees:

12

Number of SM and PhD advisees:

13