Dr. Asif Khan,

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Director, Photonics and Microelectronics Laboratory
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Education

Ph.D.	Massachusetts Institute of Technology (MIT)	1979
M.Sc.	University of Karachi (First Rank in the State),	1972
B.Sc.	University of Karachi (First Rank in the State),	1970

1. Positions Held

Carolina Distinguished Professor (USC Chaired Professorship)	2003 -Present
Director Photonics-Microelectronics Laboratory	1997 -Present
Chair, Electrical Engineering Dept., University of South Carolina, Columbia, SC	2001 - 2006
Distinguished Professor of Engineering (Chaired Professorship)	1997 - 2004
Vice President, Optoelectronics, APA Optics Inc., Blaine, Minnesota	1987 - 1997
Product Development and Technical Marketing Manager, (3M), Saint Paul, Minnesota	1985 - 1987
Senior Principal Research Scientist, Honeywell, Inc., Minneapolis, Minnesota	1979 - 1985
Research Assistant (MIT)	1974 - 1978
Lecturer, University of Karachi	1972 - 1973

2. Selected Honors and Awards

IEEE EDS Lester Eastman Award (2020)	2020
Invited Talk ECS Meeting Atlanta GA	2019
Invited Talk Fall MRS, Boston Massachusetts	2018
Invited Plenary Presentation UWBG Workshop Washington DC	2016.
Invited Presentation Lester Eastman Conference	2016
Invited Talk SPIE Photonics San Jose, CA (Jan 2016)	2016
Governor's Award of Excellence in Science and Technology	2015
Invited Plenary Speaker ISCS Montpellier France	2014
Invited Speaker SPIE Photonics West	2013
Invited Plenary Speaker Solid State Lighting Conference Turkey	2013
Invited Talk CS Mantech New Orleans LA	2013
Invited Speaker National Taiwan University, Taiwan	2012
Invited Plenary Talk ISSLED Berlin, Germany	2012
Invited Talk ISPlasma Berlin, Japan	2011
Invited Talk ICNS, Scotland	2011
Invited Talk SPIE, San Jose, CA	2010
Invited Talk ISPlasma Berlin, Japan	2011
Invited Talk ISPlasma Berlin, Japan	2011
Plenary Speaker, Indo-US Workshop on LED Lighting/Water Purification, India	2009
Invited Talk IWN Montreux, Switzerland	2008
Appointment as Honorary Lecturer, Chinese Academy of Sciences	2007
Invited Plenary Talk IWPSD, Mumbai, India	2007
Japanese Society of Applied Physics Best Research Paper Award	2006
IEEE Fellow Award	2006
Plenary Speaker, International Symposium, Blue LED (ISBLLED), Montpelier, France	2006

Invited Talk Akasaki Symposium, Meijo, Japan	2005
Invited Talk PESC, Brazil	2005
Invited Talk MRS, Boston MA	2005
Plenary Speaker, MRS Intl. Workshop on Nitride Semiconductors, Pittsburgh	2004
Northrop Grumman Silver Supplier Award for 2003 (awarded 2004)	2004
Japanese Society of Applied Physics Best Research Paper Award	2004
Carolina Distinguished Professor	2003-now
DARPA SUVOS Award for Outstanding Performance	2003
Plenary Speaker, ICNS-5, Nara, Japan,	2003
Russell Research Award for Science, Math and Engineering,	2002
USC College of Engineering Research Award,	2002
Best Invited Paper Award Workshop on "Frontiers in Electronics"	2002
Plenary Talk at ISCRM,	2000
Best Materials Research Society Poster Award,	1999
Member, International Advisory Committee, ICNS and IWN and ISGN	1995-now
Gold Medal, First Rank in State, M.S.,	1972
Gold Medal, First Rank in State, B.Sc.,	1970
Gold Medal, First Rank in State, High School,	1966

3. Economic Development

Founding Member of SET Inc. Columbia SC	2001
Founder NITEK Inc. Columbia SC	2007

4. Research Publications, Presentations and Patents Total (summary)

Publications (Refereed)	Approx. 391
Presentations (Invited)	Approx. 115
Presentations (Oral)	Approx. 180
Patents (US and International)	Approx. 40

5. Grants and Funding (Summary)

Sponsored R&D

Approximately **$40 Million** (DARPA, MDA, Air Force, Navy, DARPA, NASA, CIA and Industries)

Private Investment Funding:

Approximately **$18 Million**

6. Key Publications That Started New Research and Development Fields

Visible LED Materials and Quantum Wells (LED Lighting)

World's First GaN-AlGaN Low Pressure MOCVD	Applied Physics Letters,	Mar.1983
World's First GaN AlGaN Quantum Wells	Applied Physics Letters,	Mar.1990

High Power GaN Transistors (Power Electronics)

World's First GaN-AlGaN 2 D Electron Gas	Applied Physics Letters,	Jun. 1992
World's First GaN MESFET Transistor	Applied Physics Letters,	Apr. 1993
World's First GaN AlGaN HEMT Transistor	Applied Physics Letters,	Aug. 1993

World's First GaN-AlGaN insulated gate transistor	Electron Device Letters,	Jan. 1999

UVB/UVC LEDs for Air-Water Purification and Bio-medical Applications

World's First quaternary based deep UVB/UVC LED	Japanese JAP Letters.	2001
World's First sub 280 nm deep UVC LED	Applied Physics Letters,	Dec.2002
World's First High Power UVC LED on Low Defect AlN	Japanese JAP	2007

7. Awards Received by Student Advisees

Best Graduate Research Award (2020)	M. Abu Shahab
Best Student Poster/Paper Award ICNS-10 2013, Washington DC, 2013	Fatema Asif
Outstanding Dissertation Graduate Student Award, USC, 2004	Alex Koudymov
Outstanding Dissertation Graduate Student Award USC, 2003	Xuhong Hu
Outstanding Dissertation Graduate Student Award USC, 2003	Xuhong Hu
Outstanding Graduate Student in Microelectronics Award USC, 2002	Ahmad Tarakji
Outstanding Graduate Student in Electrical Engineering, USC, 2001	Vinod Adivarahan
Best Graduate Student College of E&IT, USC, 2001	Vinod Adivarahan

8. Research and Development Grants

Dr. Khan also has extensive experience in originating leading edge research in the III-V semiconductor technology area. These innovative concepts form the basis of numerous proposals that he has successfully marketed to various DOD agencies. The cumulative funding total over the past 5 years (2010-2015) has been close to $4 million. He has secured over 70 grants and contracts over the years totaling more than $40 million from National Science Foundation (NSF), Office of Naval Research (ONR), the Defense Advanced Research Project Agency (DARPA), Missile Defense Agency (MDA), Air Force Office of Scientific Research, (AFOSR), Jet Propulsion Laboratory (JPL), National Aeronautics and Space Administration (NASA) Space and Missile Defense Command (SMDC), Central Intelligence Agency (CIA), Rockwell, TRW, Triquint, SET, Inc., Nitek Inc. and GE. Some of the recent key grants and selected past grants are listed below.

Current Research Grants

Electrically pumped UVC Lasers	2021-2022	$100 K	ARO
Ultrawide bandgap AlGaN ionizing radiation detectors	2018-2021	$370K	NSF
MURI: Leveraging a New Theoretical Paradigm to Enhance Interfacial Thermal Transport In Wide Bandgap Power Electronics	2018-2023	$1.1 Mil	ONR
Sub-micron lithography for Ultrawide bandgap devices	2019-2020	$ 150 K	ARO
High Efficiency Micro-pillar UVC Light Emitting Diodes with Transparent AlGaN p-contact Layers.	2018-2021	$580K	ARO
AlN-Based Extreme Band Gap mm-wave Electronics (PI)	2017-2022	$1.8 Mil	DARPA

Selected Past Research Grants

AlGaN MQW Epitaxy over Sapphire & Bulk AlN	2013-2016	$540 K	Nitek
AlGaN Materials and UV Device Development	2013-2016	$720 K	Nitek.
Low dislocation density semipolar AlGaN	2011-2014	$330 K	NSF
Plasmons in III Nitrides and Nanoscale Devices	2008-2010	$300 K	NSF

AlGaN MQW Mid-UV LEDs over Sapphire & Bulk AlN	2010-2013	$700 K	DARPA
AlGaN Development	2009-2010	$257 K	Osram Sylvania
Indium Based III Nitride Semiconductor Devices	2009-2010	$1.25 M	Northrop Grumman
InGaN Based High Power Visible Lasers	2007-2010	$1.5 M	DARPA
AlGaN Based Deep Ultraviolet Injection Lasers	2006-2010	$3 M	Navy
High Frequency and High-Power Electronics Using High Quality AlN Layers and Substrates	2006-2010	$2.3 M	MDA
III-Nitride MOSHFET Based Advanced RF Circuit	2005-2008	$4.3 M	USA SMDC
AlGaN/GaN Microsensor	2005-2008	$60 K	JPL
AlInGaN MOSDHFET Based RF Circuits	2003-2006	$4.3 M	USA SMDC
Deep UV Emitters Based on Quaternary AlInGaN Multiple Quantum Well Heterostructures	2002-2006	$1.9 M	DARPA
High Performance Ultraviolet Detectors Based on Quaternary AlInGaN Layers and Heterojunctions	2001-2004	$3 M	NASA
WBGS Epitaxial Materials Development and Scale-up for RF/Microwave-Millimeter Wave Devices	2002-2004	$825 K	DARPA
Strain Energy Band Engineering in Quaternary AllNGaN Compounds: Material and Novel Device Development	2000-2003	$8.1 M	MDA
AlGaN Thin Film Battery	2000-2001	$307 K	CIA
2000-2001			
$ 350K CIA			
GaN Transistors	2000-2001	$70 K	Raytheon
AlGaN-SiC Materials & Device	1998-2000	$4.5 M	ONR
High Field Characterization Nitride Devices	1996-2001	$819 K	USA SMDC
GaN-AlGaN CCD Detectors	1996-1998	$900 K	Air Force
X-Band Power Amplifiers	1995-1998	$2.5 M	TRW
Visible Laser and Detector Devices Based On AlGaN	1994-1997	$2.5 M	DARPA
GaN-AlGaN High Temp. Transistors	1994-1995	$200 K	Navy
AlGaN Electro-OpticWaveguide Devices	1994-1996	$850 K	Air Force
Ultraviolet Laser Devices Based on GaN	1994-1996	$750 K	Air Force
AlN Bulk Crystal Growth	1994-1995	$200 K	DARPA
Junction Based Detectors	1993-1995	$500 K	Air Force
AlGaN Materials Development	1993-1996	$400 K	Navy
GaN-AlGaN FET & HEMT Devices	1993-1995	$600 K	Air Force
AlGaN-GaAs Multilayer Devices	1991-1992	$100 K	Army
AlGaN High Speed Electronic Devices	1990-1992	$550 K	Navy
AlGaN Atomic layer Epitaxy	1989-1991	$550 K	Navy
AlGaN based Detectors	1989-1992	$550 K	Air Force
AlGaAs-GaAs Directional Coupler Devices	1988-1990	$550 K	Army
AlGaAs/GaAs waveguide modulator	1987-1989	$550 K	Army
GaN Materials Development	1983-1986	$750 K	Air Force
HgCdTe Nonlinear Optical Devices	1980-1983	$750 K	Air Force

9. Sponsored Research and Development, IP Licensing and Technology Transfer

Dr. Khan's research groups have been pioneers in the field of III-Nitride materials and devices. His world class research over the years has led to numerous firsts that have been listed below. In addition, these research innovations have been the catalyst to germinate entire new research areas that have now culminated into billion-dollar businesses.

As an example, Dr. Khan was the first to demonstrate III-Nitride HEMTs in 1993, and an insulating gate HEMT in 1999 (see the summary list in Section 6 above). These devices started the entire field of GaN based rf- and high-power electronics. This is where entire defense radar systems are moving to and several large companies have launched high-efficiency power electronics products. The entire GaN power electronics industry is founded on Prof. Khan's pioneering research. Research activities following from this work currently involve many thousand researchers around the globe with major national research programs in US, Europe, Korea, Japan, Singapore, and China.

Dr. Khan's group at University of South Carolina was also the first to demonstrate AlGaN based deep ultraviolet light emitting diodes (see highlighted paper 28 below). This pioneering research has LED to a major research activity around the globe involving all major Universities, small business, and multinational corporations. Many companies are now commercializing these products. The deep UV LEDs can potentially revolutionize air/water purification, germicidal equipment, polymer curing and bio-medical instrumentation applications. Solid-state deep lighting based on Dr. Khan's pioneered DUV LEDs has been forecasted to be a billion-dollar market. This technology was transferred to two small businesses Nitek Inc and Sensor Electronics Technology Inc. (SETI), that were started by Prof. Khan. These businesses have now been acquired by Seoul-Viosys Company and have been merged in a single company.

From the above examples it is easy to gauge the quality and the innovation of Dr Khan's research. This is also reflected by a very high impact-factor as shown by google scholar. His research-impact factor is one of the highest amongst USC researchers. He is also one of the most cited researchers in the US.

The following is a list of first ever research accomplishments from Dr. Khan's research groups. Also listed is the reference publication source.

46. First enhance ment mode UWBG HEMT with peak currents over 0.5A/mm	APEX 2021
45. First UWBG HEMT with currents in excess of 1A/mm	APEX 2021
44. First substrate lifted-off deep UV LED Lamp	APEX 2011
43. First semi-polar deep UV LED	JJAP 2010
42. First vertically conducted deep UV LED	APEX 2009
41. First 280 nm deep UV microlamp	APEX 2009
40. First Deep UVLED on pulse lateral epitaxy AlN	JJAP 2007
39. First MOHVPE of AlN	JJAP 2007
38. First Deep UVLED on MOHVPE AlN	JJAP 2007
37. First 1.6 KV AlGaN/GaN HFET	EDL 2006
36. First Pulsed lateral epitaxy of AlN	APL 2006
35. First ultra-high power stable MOSHFET with 20 W/mm Output	El. Lett., July 2005
34. First deep UV LED based white light source	PSS(c), 2005
33. First milliwatt power continuous wave 280 nm deep UV LED	JJAP Lett. 2004, APL, 2004
32. First optically pumped a-plane AlGaN based laser	APL, 2004
31. First 250 nm deep UV LED	APL, 2004
30. First III Nitride p-channel Field Effect Transistor	EDL, 2002
29. First sub 300-340 nm deep UV LED	JJAP Lett., 2002
28. First sub 280 nm deep UV LED	APL, Dec., 2002
27. First AlGaN/InGaN/GaN DHFET	JJAP Lett., 2001
26. First quaternary based deep UV LED (305nm)	JJAP Lett., 2001
25. First MOSHFET Device in AlGaN over SiC	APL, 2000
24. First MOSHFET Device in AlGaN over sapphire	EDL, 1999
23. First GaN-InGaN LED over Silicon	APL, 1999
22. First Quaternary Barrier AlInGaN LEDS	APL, 2000
21. First GaN-A1N SIS Junction Detectors	APL, 1995
20. First High Temperature Vertical Cavity Lasing	Elect. Lett.,1995

19. First Voltage Controlled Photoconductive Detectors	Elect. Lett.,1995
18. First GaN High Temp. High Frequency Transistors	APL, 1995
17. First GaN-AlGaN Memory Elements	Elect. Lett.,1995
16. First GaN pn-Junction Detector	Elect. Lett.,1995
15. First InGaN Vertical Cavity Stimulated Emission	APL, Aug. 1994
14. First GaN-AlGaN Sub-micron Gate Transistor	APL, Nov. 1994
13. First GaN-AlGaN HEMT Transistor	APL, Aug. l993
12. First GaN MESFET Transistor	APL, Apr. 1993
11. First p-GaN Photovoltaic Detector	APL, May 1993
10. First GaN-AlGaN Short Period Superlattice	APL, Dec. l993
9. First GaN Photoconductive Detector	APL, Jun. 1992
8. First GaN Vertical Cavity Stimulated Emission	APL, Apr. 1991
7. First GaN-AlGaN Multilayer UV Mirrors	APL, May 1991
6. First A1N Atomic Layer Epitaxy	APL, Nov.1992
5. First GaN-AlGaN 2 D Electron Gas	APL, Jun. 1992
4. First GaN-AlGaN Quantum Wells	APL, Mar.1990
3. First GaN Atomic Layer Epitaxy	APL, Apr. 1992
2. First AlGaN Low Pressure MOCVD	APL, Sep. 1983
1. First GaN Low Pressure MOCVD	APL, Mar. 1983

Technology Commercialization and IP Licensing

Dr. Khan has been successful at transitioning the research and development to commercial products. This he was able to do at Honeywell, 3M, and APA Optics. At 3M, his business development unit pioneered CD ROM optical recording discs technology. This was successfully commercialized by 3M in collaboration with major disc drive manufacturers around the globe. Similarly, the high-speed modulator and GaN based ultraviolet detectors development at APA Optics included mechanical, optical, and electrical engineers and material scientists. Both these products were commercialized by APA Optics.

Through the years at the University of South Carolina, Dr. Khan has been very successful in transferring technology from his Photonics/Microelectronics Lab at to companies for product commercialization. One such spinoff business from his laboratory, Sensor Electronic Technology, Inc. located in Columbia South Carolina currently employs over 100 technical personnel. Using Dr. Khan's pioneering work in developing deep ultraviolet light emitting diodes, SET, Inc. is now the world's leading supplier of these devices. SET has also been very successful with Dr. Khan's university research in RF electronics, lighting, and UV sensors/LEDs (please see attached Missile Defense Agency pamphlet entitled "University of South Carolina / Sensor Electronic Technology, Inc.").

Similarly, in 2006 Dr. Khan assisted in the spinning off of another business, Nitek Inc., which is also located in Columbia SC. The company utilizes the micro-pixel deep UV LED Lamps technology pioneered by Dr. Khan's research group at University of South Carolina and currently employs about 20 Professionals. Dr. Khan's students and post-doctoral researchers have found employment with SET, Inc. and Nitek Inc. at jobs with salary in the range of $60,000-$120,000 annually.

Seoul-Viosys Inc. /Seoul Semiconductors Inc. who is one of the world's top five LED companies acquired a controlling interest in SET Inc and Nitek Inc., with an investment in excess of $30 million. These two companies that Dr. Khan founded in Columbia SC have now been partially merged into one entity to accelerate the production of deep UV LEDs whose technology was pioneered in Dr. Khan's Photonics and Microelectronics Laboratory.

The entire IP portfolio generated by Dr. Khan's during his USC research has been licensed by Nitek on and exclusive basis. In addition to the licensing revenue, the Nitek stock ownership has also resulted in substantial revenue for the University of South Carolina.

The following is a brief listing of the commercial products and US patents resulting from Dr. Khan's research:

Commercial Products

1.	Micro-pixel Deep Ultraviolet LED Lamps	Nitek, Inc.	(2009)
2.	Deep Ultraviolet Light Emitting Diodes	SET, Inc.	(2004)
3.	2, 3, & 4-inch MOSHFET/MOSDFET wafers	SET, Inc.	(2004)
4.	Visible Blind UV Photovoltaic Detectors	APA Optics	(1994)
5.	High Speed GaAs/A1GaAs Modulators	APA Optics	(1991)
6.	CD-ROM and Magneto Optics Discs	3 M Co.	(1987)
7.	Ultraviolet Detectors for Flame Safety	Honeywell Inc.	(1984)

Patents List (Partial)

43. "Multi-Finger Large Periphery AlInN/AlN/GaN Metal-Oxide Semiconductor Heterostructure Field Effect"US Paten in Progress
42. "Selectively Doped Semi-conductors and Methods of Making the Same" US Patent in Progress.
41. "Superlattice Free UV Emitter" US Patent in Progress
40. "Semiconductor and Template for Growing Semiconductors"US Patent in Progress

39. "Enhancement of Carrier's Recombination Efficiency in Semiconductor Photonic Devices"US Patent in Progress
38. "Stable High Power UV LED". Patent Number 9142714 Issued 9/22/**2015**
37. "Novel Method to Increase Breakdown Voltage of Semiconductor Devices". Patent Number 8692293 Issued April 8,**2014**
36. "UV LED with AC voltage operation" Patent Number 8698191 Issued 4/15/**2014**.
35. "Selectively Area Regrown III-Nitride High Electron Mobility Transistor" US Patent 8796097, April 5, **2014**
34. "Non-Polar UV LED and Method for Fabricating Same" US. Patent Number 8686396 Issued April 1, **2014**.
33. "High Power UV Light Source and Method for Making Same" US. Patent Number 8680551 Issued March 25, **2014**.
32. "Vertical Deep UV LED" US. Patent Number 8652958 Issued February 18, **2014**.
31. "UV LED/Laser Diode with nested superlattice" U.S. Patent 8563995 October 22, **2013**
30. "Multilayer barrier III-Nitride Transistor for HV electronics" U.S. Patent 8541817 September 24, **2013**
29. "UV LED with AC voltage operation" U.S. Patent 8507941 August 13, **2013**
28. "Fabrication Technique for High Frequency, High Power Group III-Nitride Electronic Devices" U.S. Patent 8,415,654 April 9, **2013**
27. "A Novel Growth, Process and Fabrication Technique for High Frequency High Power $Al_xIn_yGa_{1-x-y}N$ Electronic Devices" U.S. Patent 8,476,125 July 2, **2013**
26. "Digital Oxide Deposition of SiO2 layers for III-N MOSHFETs" U.S. Patent 8,372,697 February 12, **2013**
25. "Micro- pixel ultraviolet light emitting diode" Korean Patent 1122184 January 15, **2013.**
24. "Micro- pixel ultraviolet light emitting diode" U.S. Patent 8354663 January 15, **2013.**
23. "Efficient thermal management and packaging for group iii nitride based UV devices" U.S. Patent 8, 354,687 January 15, **2013.**
22. "Selective Area Lateral Epitaxy for Growth of III-Nitride Semiconductor Materials Over Polar, Non-polar and Semi-polar Substrates and Templates" U.S. Patent 8,338,273 December 25, **2012.**
21. "Method to increase the breakdown voltage of semiconductor devices" U.S. Patent 8,372,697 November 27, **2012.**
20. "Mixed source growth apparatus and method of fabricating III-Nitride UV emitters" U.S. Patent 8, 222,669, July 17, **2012**.
19. "Deep UV LED and Method for Manufacturing Same" Patent 10-1067823, November 6, **2012**

18. "Deep UV LED and Method for Manufacturing Same" Japanese Patent 5084837, November 6, **2012**
17. "Deep ultraviolet light emitting device and method for fabricating same" U.S. Patent 8,304,756 November 6, **2012**
16. "Vertical deep ultraviolet light emitting diodes" Korean 201090900 August 14, **2012**
15. "Vertical deep ultraviolet light emitting diodes" U.S. Patent 8242484 August 14, **2012**
14. "Low resistance ultraviolet light emitting device and method for fabricating same" U.S. Patent 8,415,654 April 9, **2013**.
13. "Nitride-based Heterostructure devices" U.S. Patent 7,348,606, March 25, **2008**
12. "Metal Oxide Semiconductor Heterostructure Field Effect Transistor," U.S. Patent 6,878,593, April 12, **2005**.
11. "Method of producing nitride-based Heterostructure devices," U.S. Patent 6,764,888July 20, **2004**.
10. "Metal Oxide Semiconductor Heterostructure Field Effect Transistor" U.S. Patent 6,690.042, February 10, **2004.**
9. "High Responsivity Gallium Nitride UV Detector," U.S. Patent 5,278,435, January **1994**.
8, "Aluminum gallium nitride laser" U.S. Patent 5,321,713 granted June **1994**.
7. "Method of Making a High Electron Mobility Transistor," U.S. Patent 5,296,395, March **1993**.
6. "High Electron Mobility Transistor with GaN/$Al_xGa_{l-x}N$ Heterojunctions," U.S. Patent 5,192,987, March **1993**.
5. "Narrow band AlGaN filter", U.S. Patent 5,182,670 granted January **1993**.
4. "Aluminum gallium nitride laser", U.S. Patent 5,146,465, September **1992**.
3. "UV photocathode using negative electron affinity in $Al_xGa_{1-x}N$," U.S. Patent 4,616,248, October **1986**.
2. "A tunable cut-off UV Detector based on AlGaN," U.S. Patent 4,614, 961, September, **1986**.
1. "Apparatus for determining the composition of HgCdTe and other alloy semiconductors," U.S. Patent 4,316,147, February **1982**.

Some Representative Book Chapters

7. "Comprehensive Semiconductor Science and Technology" by Asif Khan and Krishnan Balakrishnan in "III-Nitride-Based Short-Wavelength Ultraviolet Light Sources" Elsevier Publications, Editors: Pallab Bhattacharya, Roberto Fornari, Hiroshi Kamimura (2010).

6. "Present Status of Deep UV Nitride Light Emitters" Asif Khan and Krishnan Balakrishnan (Book Chapter) Materials Science Forum Vol. 590 (2008) pp 141-174. Editor: Bo Monemar

5. "Insulated Gate III-N Heterostructure Field-Effect Transistors", G. Simin, M. Shur, M. Asif Khan, R. Gaska, *in: GaN-based Materials and Devices, "Selected Topics in Electronics and Systems"*, V.33, Edited by M. S. Shur and R. F. Davis, World Scientific Publishing Co., Singapore, ISBN 981-238-844-3, 2004.

4. "GaN and AlGaN Devices: Field Effect Transistors and Photodetectors ", M. S. Shur and M. A. Khan, *Series Optoelectronic Properties of Semiconductors and Superlattices*, Gordon and Breach Science Publishers, Vol. 7, pp. 47-92, S. Pearton, Editor, 2000.

3. M. S. Shur, A. D. Bykhovski, R. Gaska, and A. Khan, GaN-based Pyroelectronics and Piezo electronics, in Handbook of Thin Film Devices, Volume 1: Hetero-structures for High Performance Devices, Edited by Colin E.C. Wood, Handbook edited by Maurice H. Francombe, pp. 299-339, Academic Press, San Diego, 2000.

2. M. S. Shur and M. Asif Khan, GaN and AlGaN Ultraviolet Photodetectors, Academic Press, Semiconductors and Semimetals, vol. 57, pp. 407-439, T. Moustakas and J. Pankove, Editors (1998).

1. “GaN Based Field Effect Transistors”, M. S. Shur, A. Khan, *High Temperature Electronics*, ed. M. Willander and H. Hartnagel, Chapman, London, 1996.

Publications

Total refereed journal publications in excess of 375. Total conference presentation and publications in excess of 200.

Publications 2011-now

412 “High Current Density Enhancement Mode AlGaN/AlGaNMetal-Insulator-Semiconductor-Hetersotructure Field-Effect-Transistors”, H. Xue, K. Hussain, V. Talesara, T. Razzak, M. Gaevski, S. Mollah, S. Rajan, A. Khan and W. Lu, Physica Sta-tus Solidi-Rapid Research Letter, 2000576, (2021). DOI: https://doi.org/10.1002/pssr.202000576

411 “High-current recessed gate enhancement-mode ultrawide bandgap $Al_xGa_{1-x}N$ channel MOSHFET with drain current 0.48 A mm^{-1} and threshold voltage+ 3.6 V”, S. Mollah, K. Hussain, A. Mamun, M. Gaevski, G. Simin, MVS. Chandrashekhar and A. Khan, Appl. Phys. Express, 14, 014004, (2021). DOI: https://doi.org/10.35848/1882-0786/abd599

410 "An opto-thermal study of high brightness 280nm emission AlGaN micropixel light-emitting diode arrays", R. Floyd, M. Gaevski, M. D. Alam, S. Islam, K. Hussain, A. Mamun, S. Mollah, G. Simin, M. V. S. Chandrashekhar and A. Khan, Appl. Phys. Express, 14, 014002, (2020). **Spotlight article. DOI: https://doi.org/10.35848/1882-0786/abd140

409 “Temperature characteristics of high-current UWBG enhancement and depletion mode AlGaN-channel MOSHFETs”, S. Mollah, M. Gaevski, K. Hussain, A. Mamun, MVS. Chandrashekhar, G. Simin and A. Khan, Appl. Phys. Lett., 117, 232105, (2020). DOI: https://doi.org/10.1063/5.0031462

408 “Ultrawide bandgap $Al_xGa_{1-x}N$ channel heterostructure field transistors with drain currents exceeding 1.3 A mm^{-1}”, M. Gaevski, S. Mollah, K. Hussian, J. Letton, A. Mamun, M. U. Jewel, MVS. Chandrashekhar, G. Simin and A. Khan, Appl. Phys. Express, 13, 094002, (2020). DOI: https://doi.org/10.35848/1882-0786/abb1c8

407 “Bulk-like Intrinsic Phonon Thermal Conductivity of Micrometer-Thick AlN Films”, Y. R. Koh, Z. Cheng, A. Mamun, M. S. B. Hoque, Z. Liu, T. Bai, K. Hussain, M. E. Liao, R. Li, J. T Gaskins, A. Giri, J. Tomko, J. L Braun, M. Gaevski, E. Lee, L. Yates, M. S. Goorsky, T. Luo, A. Khan, S. Graham, and P. E. Hopkins, ACS Appl. Mater. Interfaces, 12, 26, 29443-29450, (2020). DOI: https://doi.org/10.1021/acsami.0c03978

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17. “Vertical cavity, room temperature stimulated emission from photopumped GaN films deposited over sapphire substrates using LPMOCVD,” M.Asif Khan, J.M. Van Hove, D.T. Olson and J.N. Kuznia, Applied Physics Letters 58(14), 1515 (1991).

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12. “Non-resonant and Bandgap Resonant OPC in Hg0.784Cd0.216Te,” CLEO 82, Phoenix, April 14-16, 1982 (with P.W. Kruse).

11. “Mechanisms of Optical Phase Conjugation in (Hg, Cd) Te” International Conference on Lasers '82, New Orleans, Dec. 13-17, 1982. (with P.W. Kruse) (by invitation).

10. “Phase Conjugation and Nonlinear Fabry-Perot Effect in HgCdTe Epilayer” CLEO 83, Baltimore, May 1983. (with P. W. Kruse, R. A. Wood, and Y. K. Park).

9. “Bandgap-resonant Optical Phase Conjugation in n-type Hg1-xCdxTe at 10.6 micron.” Optics Letters, 6,560 (1981) (with R.L.H. Bennet, P.W. Kruse).

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7. “Optical Phase Conjunction in HgCdTe” Proceedings of the Symposium on Wavefront Distortions in Power Optics SPIE Bellingham, Washington (1981) (with P.W. Kruse and J.F. Ready).

6. “Noncollinear Phase-Matched four-photon mixing in HgO.77CdO.23Te,” Optics Letters, 5, 469 1980) (with T.J. Bogart, P.W. Kruse, and J.F. Ready).

5. “Optical Phase Conjugation in Hg1-xCdxTe,” Optics Letters, 5, 261 (1980) (with P.W. Kruse and J.F. Ready).

4. “Nonlinear Optical Effects in Hg1-xCdxTe,” Infrea. Phys. 19, 497 (1979) (with P.W. Kruse and J. F. Ready).

3. “Resonant Four Photon and Higher Order Mixing in HgCdTe,” Opt. Comm. 28,3742 (1979) (with P.W. Kruse and J.F. Ready).

2. “Dispersion of Nonlinear Optical Susceptibility in n-Ge,” Optics Comm. 21, 154 (1979) (with R.A. Wood, P.A. Wolff and R.L. Aggarwal).

1. “Resonant Four Wave Mixing in n-Si,” Optics Comm. 30, 206 (1977), with D.J. Melhner and P.A. Wolff).

Conference Presentations

Dr. Khan has established himself as one of the top researchers in the field of wide bandgap semiconductor materials and devices. His research group pioneered state-of-the-art research approaches to solve several key problems. Various research groups that followed in the field subsequently adopted these innovative approaches. The excellence of the research effort is well recognized and has resulted in numerous plenary and invited presentations, as listed below:

Recent Invited Presentations

- Invited Talk ECS Meeting Atlanta GA 2019
- Invited Talk Fall MRS, Boston Massachusetts 2018
- Invited Plenary Presentation UWBG Workshop Washington DC 2016.
- Invited Presentation Lester Eastman Conference 2016
- Invited Talk SPIE Photonics San Jose, CA 2016
- Invited Plenary Speaker ISCS Montpellier France 2014
- Invited Plenary Speaker Solid State Lighting Conference Turkey 2013
- Invited Talk CS Mantech New Orleans LA 2013
- Invited Talk SPIE Photonics West San Francisco CA 2013
- Invited Speaker National Taiwan University, Taiwan 2012

- Invited talk ISSLED Berlin Germany 2012
- Invited Plenary Talk ISSLED Berlin, Germany 2012
- Invited Talk ISPlasma Berlin, Japan 2011
- Invited Talk ICNS, Scotland 2011
- ISPlasma 2011 Nagoya, Japan 2011
- WOCSEMMAD Savannah, GA 2011
- SPIE West 2010 San Francisco, CA 2011
- IWN 2010 Tampa, FL 2010
- Les.Eastman Conf. on High Power Devices Troy, NY 2010
- CLEO 2010 San Joes, CA 2010

Past Invited Presentations

- ACCGE-17 Lake Geneva, WI 2009
- ICAM 2009 Rio De Janeiro, Brazil 2009
- ICNS 2009 Jeju, Korea 2009
- China Intl Forum on Solid State Lighting Shenzhen, China 2009
- Indo-US Workshop on Visible and Ultraviolet Sources for Solid State Lighting and Water Purificaiton Chennai, India 2009
- IWN Montreux, Switzerland 2008
- ISSLED Phoenix, AZ 2008
- GOMACTech Las Vegas, NV 2008
- SMC Montreal, Canada 2007
- WOCSEMMAD Savannah, GA 2007
- SIMC-XIV Fayetteville, AK 2007
- INS Las Vegas, NV 2007
- Japanese Applied Physics Society Tokushima, Japan 2007
- Intl LED Expo 2006 Korea 2006
- Internat'l Symposium on Blue Laser & LEDs Montpelier, France 2006
- ECS Meeting Denver, CO 2006
- MRS Spring Meeting San Francisco 2006
- Intl Wrkshp on Nanocience/ICTP Madras, India 2006
- ICMOVPE-XIII Miyazaki, Japan 2006
- UK Nitride Consortium Glasgow, Scotland 2006
- Intl Wkshp on Crystal Growth Chennai, India 2006
- WBG Summer Wide Bandgap Mtg. St. Louis, Missouri 2005
- 4th Intl Conf on Adv Materials/Devices Jeju Is., Korea 2005
- IEDM Washington, DC 2005
- 4th Intl Workshp Indus Tech Opt. Semi. Gwangju., Korea 2005
- 5th Akasaki Research Ctr. Symposium Japan 2005
- 2005 MRS Fall Meeting Boston 2005
- CIFSSL '05 Xiamen, China 2005
- Optics in the Southeast Atlanta, Geogia 2005
- 6th Intl Conf Nitride Semic (Plenary) Bremen, Germany 2005
- Plenary Speaker, IEEE PESC Recife, Brazil 2005
- 16th ACCGE Big Sky, Montana 2005
- WOCSEMAAD Miami 2005
- AFOSR Nitride Workshop Anchorage, Alaska 2004
- 27th Intl Conf. Physics Semiconductors Flagstaff, AZ 2004
- 2004 Intl Workshp Nitride Semiconductors Pittsburgh, PA 2004

• 12th Intl. Symp. Nanostructures	St. Petersburg, Russia	2004
• ARO Workshop	Charlotte, NC	2004
• MRS Spring Conference	San Francisco	2004
• ECS 2004	Hawaii	2004
• Plenary Talk ICNS	Nara, Japan	2003
• MRS Int'l Symposium	Boston, MA	2003
• ECS Int'l Meeting	Paris	2003
• ASU Lawrence Symposium	Tempe, Arizona	2003
• TWHM Workshop	Okinawa, Japan	2003
• Photonics West	San Jose, CA	2003
• Mantech	Phoenix, AZ	2003
• 2003 ISDRS	Washington, DC	2003
• IEEE Sensors 2002	Orlando, Florida	2002
• ISCS 2002	Lausanne, Switzerland	2002
• WOCSDICE 2002	Moscow, Russia	2002
• EMRS 2002	Strasbourg, France	2002
• WOCSEMMAD 2002	Austin, TX	2002
• URSI 2002	Boulder, CO	2002
• Frontier Science Research Conf.	La Jolla, CA	2001
• MRS 2001 Fall	Boston, MA	2001
• ISCS 28th Intl Symposium	Tokyo, Japan	2001
• ISDRS 2001	Charlottesville, VA	2001
• ICNS-4	Denver, CO	2001
• MRS 2001 Spring	San Francisco, CA	2001
• GOMAC 2001	San Antonio, TX	2001
• ECS 2001	Philadelphia, PA	2001
• MRS 2000 Spring Meeting	San Francisco, CA	2000
• 6th Wide Bandgap III Nitride Wkshop	Richmond, VA	2000
• 42nd EMC 2000	Denver, CO	2000
• Device Research Conference 2000	Denver, CO	2000
• MRS 2000 Fall Meeting	Boston, MA	2000
• Bulk Substrates Workshop	Brazil	2000
• SiC & Related Materials Conference	Germany	2000
• Polarization Effects in Semiconductors	Glacier Park, MT	2000
• MRS Int'l Fall Meeting	Boston, MA	1999
• 1999 EMC	Santa Barbara, CA	1999
• Int'l Compound Semiconductor Mtg.	Japan	1998
• MRS Spring Meeting	San Francisco, CA	1998
• European SSDRC	Stuttgart, Germany	1997
• MRS Fall Meeting	Boston, MA	1997
• ISDRS	Charlottesville, VA	1997
• MRS Conference	San Francisco, CA	1997
• Int'l Semiconductor Conference	Berlin	1996
• European MRS Symposium C	France	1996
• International Device Symposium	Sapporo, Japan	1996
• Society Radio Eng. Conference	Colorado	1996
• European MRS Symposium A	France	1996
• ISDRS Workshop	Charlottesville, VA	1995
• SiC and Nitride Conference	Kyoto, Japan	1995
• III-N International Workshop	Nagoya, Japan	1995

• MRS Nitride Symposium	Boston, MA	1995
• Gordon Research Conference	New Hampshire	1995
• European MOVPE Workshop	Gent, Belgium	1995
• International III-N Workshop	Nagoya, Japan	1995
• International SiC Conference	Kyoto, Japan	1995
• SPIE Workshop	San Jose, CA	1995
• PCSI	Tucson, AZ	1995
• Gordon Research Conference	California	1994
• SPIE	San Francisco, CA	1994
• Materials Research Society	San Francisco, CA	1994
• Optical Society of America	Toronto, Canada	1994
• International OE Workshop	Banglore, India	1994
• International OE Workshop	Mexico City, Mexico	1994
• Tropical OE Workshop	California	1994

Selected Recent Conference Presentations 2017-Now

- Mikhail Gaevski , Shahab Mollah , Kamal Hussain , Richard Floyd , Abdullah Mamun , MVS Chandrashekhar , Iftikhar Ahmad , Grigory Simin , Virginia Wheeler , Charles Eddy and Asif Khan, "Recent advances in III-Nitride devices using ultrawide bandgap $Al_xGa_{1-x}N$ Active layers" 236th ECS Meeting, October 13-17, 2019, Atlanta, GA **(INVITED)**

- M. Mamun, Kamal Hussain, A. Iftikhar, M. Gaevski, MVS. Chandrashekhar, Kenny Huynh, Michael Liao, Tingyu Bai, M. Goorsky, G. Simin and Asif Khan, "Crack and Strain Free 16 µm thick AlN on Sapphire templates" 13th International Conference on Nitride Semiconductor 2019 (ICNS-13), Bellevue, WA, July 07-12, 2019.

- Richard Floyd, Fatima Asif, Mikhail Gaevski, Grigory Simin, MVS Chandrashekhar and Asif Khan, "Optical Waveguiding in MEMOCVD-Grown AlGaN for DUV Integrated Optoelectronic Devices", 13th International Conference on Nitride Semiconductor 2019 (ICNS-13), Bellevue, WA, July 07-12, 2019.

- Mikhail Gaevski, Shahab Mollah, Kamal Hussain, Richard Floyd, Abdullah Mamun, MVS Chandrashekhar, Iftikhar Ahmad, Grigory Simin, Virginia Wheeler, Charles Eddy and Asif Khan, "Dynamic Performance of AlGaN MOSHFETs with high-k ALD oxides", 13th International Conference on Nitride Semiconductor 2019 (ICNS-13), Bellevue, WA, July 07-12, 2019.

- Shahab Mollah, Kamal Hussain, Richard Floyd, Abdullah Mamun, Mikhail Gaevski, MVS Chandrashekhar, Iftikhar Ahmad, Grigory Simin, Virginia Wheeler, Charles Eddy and Asif Khan, "$Al_xGa_{1-x}N$ (x>0.4) Channel MOSHFETs with high-k ALD gate-oxides", 13th International Conference on Nitride Semiconductor 2019 (ICNS-13), Bellevue, WA, July 07-12, 2019.

- Mohi Uddin Jewel, Md. Didarul Alam, Shahab Mollah, Richard Floyd, Kamal Hussain, Mikhail Gaevski, Iftikhar Ahmad, Grigory Simin, Asif Khan, and MVS Chandrashekhar, "Solar Blind High-k ZrO_2 Gate AlGaN MOSHFET Photodetector", 13th International Conference on Nitride Semiconductor 2019 (ICNS-13), Bellevue, WA, July 07-12, 2019.

- Shahab Mollah, Richard Floyd, Kamal Hussain, Mikhail Gaevski, Iftikhar Ahmad, MVS Chandrashekhar, Grigory Simin, Virginia Wheeler, Charles Eddy and Asif Khan, "AlGaN MOSHFETs with high-k ALD oxides" 61st Electronic Materials Conference (EMC) 2019, Ann Arbor, MI, June 26- 28, 2019.

- Richard Floyd, Fatima Asif, Mikhael Gaevski, Grigory Simin, MVS Chandrashekhar and Asif Khan, "A study of optical waveguiding using DUV AlGaN integrated optical devices", 61st Electronic Materials Conference (EMC) 2019, Ann Arbor, MI, June 26- 28, 2019.

- Xuhong Hu, Richard Floyd, Abu Shahab, Kamal Hussein, Seongmo Hwang, Fatima Asif, Grigory Simin, MVS Chandrashekhar, Sakib Muhtadi and Asif Khan, High-Al AlxGa1-xN Channel Transistors Over Thick AlN/Sapphire Templates (Invited) 2018 Fall MRS Meeting Boston Massachusetts, November 25-30, 2018.

- Xuhong Hu, Seongmo Hwang, Kamal Hussain, Richard Floyd, Shahab Mollah, Fatima Asif, Grigory Simin, Virginia Wheeler, Charles Eddy and Asif Khan, Al0.65Ga0.35N/Al0.40Ga0.60N HEMTs with insulating oxide-gates, 2018 Lester Eastman Conference on High Performance Devices, August 12-14 2018, Columbus, Ohio.

- Richard Floyd, Shahab Mollah, Xuhong Hu, Kamal Hussain, Seongmo Hwang, Antwon Coleman, Fatima Asif, MVS Chandrashekhar, Grigory Simin and Asif Khan, High-Al AlxGa1-xN Channel HEMTs over thick AlN/Sapphire Templates. 2018 Lester Eastman Conference on High Performance Devices, August 12-14 2018, Columbus, Ohio.

- Venkata S.N. Chava, Bobby G. Barker, Anusha Balachandran, Asif Khan, G Simin, Andrew B. Greytak and MVS Chandrashekhar, 'High Detectivity Visible-Blind SiF4 Grown Epitaxial Graphene/SiC Schottky Contact Bipolar Phototransistor' , presented at the 60th Electronic Materials Conference, Santa Barbara, CA (2018), peer reviewed.

- Venkata S.N. Chava, Bobby G. Barker, Anusha Balachandran, Asif Khan, G Simin, Andrew B. Greytak and MVS Chandrashekhar, 'High Detectivity Visible-Blind SiF4 Grown Epitaxial Graphene/SiC Schottky Contact Bipolar Phototransistor' , presented at the 60th Electronic Materials Conference, Santa Barbara, CA (2018), peer reviewed.

- High Al-content AlxGa1-xN based Field Effect Transistors over low cost AlN/sapphire templates for High Temperature Operation, Sakib Muhtadi, S. Hwang, A. Coleman, F. Asif, MVS Chandrashekhar, G. Simin and Asif Khan, ICNS 2017, Strasbourg France.

- High Al-content AlxGa1-xN Heterojunction based Solar Blind Sensors, Sakib Muhtadi, S. Hwang, A. Coleman, F. Asif, V.S.N. Chava, MVS Chandrashekhar, G. Simin and Asif Khan, ICNS 2017 Strasbourg France.

- $Al_{0.65}Ga_{0.35}N$ Channel High Electron Mobility Transistors on AlN/Sapphire Templates, Sakib Muhtadi, SeongMo Hwang, Antwon L. Coleman, Fatima Asif, Asif Khan, Device Research Conference (DRC), pp. 143, USA, 2017.

- High Temperature operation of n-$A_{l0.65}Ga_{0.35}N$ Channel Metal Semiconductor Field Effect Transistors on low-defect AlN Templates with Regrown Graded Contacts, S. Muhtadi, S. Hwang, A. Coleman, F. Asif, A. Lunev, MVS Chandrashekhar and M.A. Khan, 59th Electronic Materials Conference (EMC), pp. 46, USA, 2017.

- Solar blind UV detection using high-Al content $Al_xGa_{1-x}N$ devices: towards responsivity $>10^6$A/W, S. Muhtadi, S. Hwang, A. Coleman, A. Lunev, F. Asif, V.S.N. Chava, MVS Chandrashekhar, A. Khan, 59th Electronic Materials Conference (EMC), pp. 46, USA, 2017.

- Voltage tunable solar-blindness in a UV detector using a TFS grown Epitaxial Graphene (EG)/SiC heterojunction bipolar phototransistor, Venkata S.N. Chava, Anusha Balachandran, Sakib M. Muhtadi, M. Asif Khan, MVS Chandrashekhar, 59th Electronic Materials Conference (EMC), pp. 43, USA, 2017.

- Weak Localization and Shubnikov-de Haas Oscillation in High Carrier Density AlInN/GaN Hetereostructures, Lei Wang, Sakib Muhtadi, Ming Yin, Eun Sang Choi, Asif Khan, Timir Datta, American Physical Society (APS) Meeting, Vol. 62, No. 4, USA, 2017.

Selected Conference Presentations 2005-2016

Approximately more than 80 conference presentations 2005-2016. Some representative presentations are listed below.

- "Pulsed Modulation Doping of AlxGa1-xN (x>0.6) AIGaN Epilayers for Deep UV Optoelectronic Devices", M. Sultana, Hung-Chi Chen, Antwon Coleman, Asif Khan, Iftikhar Ahmad, Bin Zhang and Vinod Adivarahan, 10th International Conference on Nitride Semiconductors, 2013.

- "Substrate Lifted-off AlGaN/AlGaN Lateral Conduction Thin-Film Light-Emitting Diodes Operating at 285 nm" F. Asif, H.C. Chen, A. Coleman, M. Lachab, I. Ahmad, B. Zhang, Q. Fareed, V. Adivarahan and M. Asif Khan, , IWN2012, Sapporo, Japan (2012).

- "Pseudomorphic AlxGaI-xN MQW Based Deep UV Light Emitting Diodes over Sapphire Substrates, Fatima Asif , Hung-Chi Chen, Antwon Coleman, Asif Khan, Iftikhar Ahmad , Bin Zhang , Joe Dion, Lachab Mohamad, Ahmad Heidari and Vinod Adivarahan, 10th International Conference on Nitride Semiconductors, 2013.

- "Substrate Lifted-off 270 nm Emission Lateral Conduction LED with a Micro-pixel Geometry", F. Asif, R. Chen, A. Coleman, I. Ahmad, M. Lachab, B. Zhang, Q. Fareed, V. Adivarahan, and A. Khan, International Workshop on Nitride Semiconductors, Sapporo, Japan, 2012.

- "Stable and High-Efficiency Deep Ultraviolet LED Lamps with Micro-pixel Geometry", B. Zhang, I. Ahmad, A. Coleman, R. Chen, J. Dion, M. Lachab, Q. Fareed, C. Moe, M. Wraback, V. Adivarahan, A. Khan, International Workshop on Nitride Semiconductors, Sapporo, Japan, 2012.

- "Growth of Deep Ultraviolet Light Emitting Diodes on Patterned Sapphire Substrates", I. Ahmad, V. Adivarahan, B. Zhang, J. Dion, M. Lachab, R. Chen, Q. Fareed, A. Khan, 9th International Conference on Nitride Semiconductors, 2011.

Conference Presentations 2004-2005

95. GaN multiple quantum well based deep UV LEDs and their applications," Invited Speaker, 6th International Conference on Nitride Semiconductors, Bremen, Germany, August 28 – September 2, 2005.

94. "Reliability and degradation modes of 280 nm deep UV LEDs on sapphire," Z. Gong, S. Chhajed, M. E. Gaevski, W. Sun, V. Advivarahan, M. Shatalov and Asif Khan, Material Research Society (MRS) Fall Meeting 2005, November 28 – December 2, 2005, Boston, Massachusetts, USA.
93. "270 nm Deep UV LEDs with a Micro-Pixel Design," S. Wu, A. Sattu, L. Yan, Y. Praveen, H. Faruq, W. Sun, M. Shatalov, V. Adivarahan and Asif Khan, Material Research Society (MRS) Fall Meeting 2005, November 28 – December 2, 2005, Boston, Massachusetts, USA.
92. "Failure Analysis and Reliability of 280 nm AlGaN based Deep UV LEDs", Z. Gong, S. Chhajed, A. Sattu, M. E. Gaevski, W. H. Sun, S. Wu, V. Adivarahan, M. Shatalov, and M. Asif Khan, Optics in the Southeast 2005, October 6 - 8, 2005, Atlanta, Georgia, USA.
91. "Matrix Addressable Micro-Pixel AlGaN based 280 nm Deep UV LED", S. Wu, S. Chhajed, A. Sattu, Y. Li, S. Srivastava, M. Islam, W. H. Sun, M. Shatalov, V. Adivarahan and M. Asif Khan, Optics in the Southeast 2005, October 6 - 8, 2005, Atlanta, Georgia, USA.
90. "Non-catalyst growth and characterization of a-plane AlGaN nanorods", M. E. Gaevski , W. Sun, J. Yang, V. Adivarahan, A. Sattu, I. Mokina, M. Shatalov, G. Simin and M. Asif Khan, 6th International Conference on Nitride Semiconductors (ICNS-6), August 28 - September 2, 2005, Bremen, Germany.
89. "Deep ultraviolet light-emitting diode lamps", X. Hu, J. Deng, J. P. Zhang, A. Lunev, Y. Bilenko, T. Katona, M. Shur, R. Gaska, M. Shatalov and M. A. Khan, 6th International Conference on Nitride Semiconductors (ICNS-6), August 28 - September 2, 2005, Bremen, Germany.
88. "Formation of InGaN Low Dimensional Structures Over a-plane GaN ELOG Template", M. E. Gaevski, C. Q. Chen, E. Kuokstis, J. Li, M. Shatalov, Z. Gong, V. Adivarahan, A. Sattu, I. Mokina, J. Yang and M. Asif Khan, Material Research Society (MRS) Spring Meeting 2005, March 28 – April 1, 2005, San-Francisco, California, USA.

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87. "255 nm Interconnected Micro-Pixel Deep Ultraviolet Light Emitting Diodes", M. Asif Khan, S. Wu, W. H. Sun, A. Chitnis, V. Adivarahan, M. Shatalov, J. W. Yang, International Electronic Device Meeting (IEDM-2004), December 13 - 15, 2004, San Francisco, California, USA.
86. "265 nm Deep Ultraviolet Emitters", W. H. Sun, V. Adivarahan, S. Wu, A. Sattu, A. Chitnis, M. Shatalov, M. Asif Khan, Material Research Society Fall Meeting 2004, November 29 - December 2, 2004, Boston, Massachusetts, USA.
85. "Reliability and Operation Lifetime Studies of sub-280 nm Ultraviolet Emitters on Sapphire Substrates", A. Chitnis, M. Shatalov, S. Wu, S. Saygi, W. H. Sun, V. Adivarahan, M. Asif Khan, Material Research Society Fall Meeting 2004, November 29 - December 2, 2004, Boston, Massachusetts, USA.
84. "Metalorganic Chemical Vapor Deposition of Non-Polar III-Nitride Films Over a-Plane SiC Substrates", J. Li, Z. Gong, C. Q. Chen, V. Adivarahan, M. Gaevski, E. Kuokstis, M. Shatalov, Y. Gao, Z. Zhang, A. Arjunan, T. S. Sudarshan, H. P. Maruska, J. W. Yang, M. Asif Khan, Material Research Society Fall Meeting 2004, November 29 - December 2, 2004, Boston, Massachusetts, USA.
83. "Deep UV LEDs for Water and Air Purification", M. S. Shur, J. P. Zhang, X. Hu, J. Deng, Y. Bilenko, A. Lunev, R. Gaska, M. Shatalov and Asif Khan, 2004 Joint International Meeting and 206th Meeting of The Electrochemical Society, October 3-8, 2004, Honolulu, Hawaii, USA
82. "Strain Energy Band Engineering for Nitride Based Deep UV LEDs", M. S. Shur, J. P. Zhang, X. Hu, J. Deng, Y. Bilenko, A. Lunev, R. Gaska, M. Shatalov, Asif Khan, 31st International Symposium on Compound Semiconductors (ISCS-2004), September 12 – 16, 2004, Seoul, Korea.
81. "White light generation using 280nm light emitting diode pumps", M. Shatalov, S. Wu, V. Adivarahan, W. H. Sun, A. Chitnis, J. W. Yang, Yu. Bilenko, R. Gaska, Asif Khan, International Workshop on Nitride Semiconductors, IWN 2004, July 19 - 23, 2004, Pittsburgh, Pennsylvania, USA.
80. "Influence of Stacking Faults on the Properties of GaN-based UV Light-Emitting Diodes Grown on Non-Polar Substrates", C. Q. Chen, V. Adivarahan, M. Shatalov, E. Kuokstis, J. W. Yang, H. P. Maruska, Z. Gong, M Asif Khan, International Workshop on Nitride Semiconductors, IWN 2004, July 19 - 23, 2004, Pittsburgh, Pennsylvania, USA.

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75. "Optically Pumped Lasing in Non-Polar A-Plane GaN Film", E. Kuokstis, C. Q. Chen, J.W. Yang, V. Adivarahan, M. Shatalov, M. A. Khan, Material Research Society Fall Meeting 2003, December 1-5, 2003, Boston, Massachusetts, USA.
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72. "AlGaN MQW Based Deep UV Light Emitting Diodes with Significantly Reduced Long wave Emission", J. Zhang, W. Shuai, S. Rai, V. Mandavilli, V. Adivarahan, A. Chitnis, M. Shatalov, M. Asif Khan, 8th Wide Bandgap III Nitride Workshop, September 29 – October 1, 2003, Richmond, Virginia, USA.
71. "UV Visible Light Emitting Diodes Using NonPolar GaN AlInGaN MQW Active Regions over Rplane sapphire", A. Chitnis, V. Adivarahan, C. Chen, J. Yang, W. Sun, H. Wang, M. Shatalov, M. Asif Khan, 8th Wide Bandgap III Nitride Workshop, September 29 – October 1, 2003, Richmond, Virginia, USA.
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61. "InGaN channel double heterostructure field effect transistors", H. M. Wang, J. P. Zhang, A. Koudymov, S. Saygi, H. Fatima, G. Simin, J. Yang, M. Asif Khan, X. Hu, A. Tarakji, M. S. Shur, and R. Gaska, MRS Fall Meeting, Boston, MA, pp. 9-9, L9.9, December 2-6, 2002.

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19. "AlGaN-GaN-AlGaN Induced Base Transistor", A. D. Bykhovski, M. S. Shur, R. Gaska, M. A. Khan, and J. W. Yang, MRS Fall Meeting, November 30-December 3, Boston, MA 1999.

18. "Negative Differential Conductivity in AlGaN/GaN HEMTs: Real Space Charge Transfer from 2D to 3D GaN States?", J. Deng, R. Gaska, M. S. Shur, M. A. Khan, and J. W. Yang, MRS Fall Meeting, November 30-December 3, Boston, MA 1999.

17. "Low-Frequency Noise in AlGaN/GaN Heterostructures on SiC and Sapphire Substrates", N. Pala, R. Gaska, M. Shur, J. W Yang and M. A. Khan, MRS Fall Meeting, November 30-December 3, Boston, MA 1999.

16. "Strain Modulation and Piezoelectric Doping in AlInGaN/GaN Heterostructures", J. W. Yang, M. A. Khan, G. Simin, R. Gaska, A. Bykhovski, and M. S. Shur, ICSCRM99, NC, 1999.

15. "Low Temperature Deposited Non-Single Crystal Layers of $Al_xGa_{1-x}N$ for Device Applications", M. A. Khan, J. Yang, V. Adivarahan, G. Simin, R. Gaska and M. S. Shur, ICSCRM99, NC, 1999.

14. "Electron-Hole Plasma in GaN-Quantum Wells under High Optical Excitation", G. Tamulaitis, S. Juršėnas, G. Kurilčik, A. Žukauskas, R. Gaska, M. S. Shur, J. W. Yang and M. A. Khan, ICSCRM99, NC, 1999.

13. "Low-Resistivity Pd/Au Ohmic Contacts to p-GaN for Heterostructure Bipolar Transistors and Light Emitting Diodes", A. Lunev, V. Chaturvedi, A. Chitnis, Grigory Simin, J. Yang, M. A. Khan, R. Gaska, and M. S. Shur, ICSCRM99, NC, 1999.

12. "Pyroelectric Effect in AlN Films", E. A. Yigit, M. S. Shur, R. Gaska, J. W. Yang, and M. A. Khan, ICSCRM99, NC, 1999.

11. "Surface Acoustic Waves in Free- and Metallized-Surface GaN", R. Gaska, D. Ciplys, R. Rimeika, M. A. Khan, J. W. Yang and M. S. Shur, ICSCRM99, NC, 1999.

10. "Accumulation Hole Layer in Inverted p-GaN/$Al_{0.15}Ga_{0.85}N$ Heterostructures", M. S. Shur, R. Gaska, J. W. Yang, G. Simin, and M. A. Khan, ICSCRM99, NC, 1999.

9. "Characterization of Thick GaN Layers Using Guided Optical Waves", D. Ciplys, R. Rimeika., M. Asif Khan, J. W.Yang, R. Gaska and M. S. Shur, ICSCRM99, NC, 1999.

8. "Photoluminescence Dynamics in Strained AlGaN/GaN Quantum Wells", R. Gaska, M. S. Shur, A. Bykhovski, G. Tamulaitis, A. Zukauskas, S. Jursenas, G. Kurilcik, M. A. Khan, and J. W. Yang, ICNS3, Montpellier, France, July 5-9 (1999).

7. "A Very Strong Piezoresistive Effect in p-GaN", R. Gaska, M. S. Shur, M. A. Khan, J. W. Yang, V.V. Kaminski, and S. M. Soloviov, ICNS3, Montpellier, France, July 5-9 (1999).

6. "Strain Energy Band Engineering in AlInGaN/GaN Heterostructure Field Effect Transistors", M. A. Khan, M. S. Shur, and R. Gaska, 29th European Microwave Conference (GaAs'99), Munchen, 4-8 October, 1999 (Invited).

5. "1/f Noise in AlGaN/GaN HEMTs", S. Rumiantsev, M. Levinshtein, R. Gaska, M. S. Shur, M. A. Khan, and J. W. Yang, WOCSEMMAD'99, New Orleans, LA, February 22-24, 1999.

4. "AlInGaN/GaN Heterostructures: New Approach to Strain Energy Band Engineering (SEBE)", M. A. Khan, J. W. Yang, H. zur Loye, G. Simin, R. Gaska, M. S. Shur, G. Tamulaitis, and A. Zukauskas, WOCSEMMAD'99, New Orleans, LA, February 22-24, 1999.

3. "Piezoresistive effect in p-GaN", R. Gaska, M. S. Shur, A. Bykhovski, J. W. Yang, M. A. Khan, V. V. Kaminskii, and S. Soloviov, WOCSEMMAD'99, New Orleans, LA, February 22-24, 1999.

2. "Effects of Surface Roughness on Electron Mobility in AlInGaN/GaN Heterostructures", A. Khan, R. Gaska, J. W. Yang, G. Simin, A. Bykhovski and M. S. Shur, EMC'99, Santa Barbara, CA, 1999.

1. "Two-Dimensional Electron Gas Density and Polarisation Effects in AlInGaN/GaN Heterostructures", J. W. Yang, M. A. Khan, R. Gaska, G. Simin, A. Bykhovski and M. S. Shur, EMC'99, Santa Barbara, CA, 1999.

Additionally, about seventy oral presentations prior to 1999 at various technical meetings. This includes presentations at EMC, DRC, CLEO, MRS, Int'l SiC workshop, Int'l GaN workshop, Gordon research conference, Optical Society of the U.S., and SPIE Meetings

Teaching

Dr. Khan established the Photonics Microelectronics course sequence after joining the EE department. This includes the required course ELCT 363 which is then followed by two 500 level courses namely ELCT 563 and ELCT 566. These courses serve as the core courses for semiconductor materials and devices section of the the PhD qualifying exam.

These courses are then followed by 700 and 800 level courses. Over the past 5 years Dr. Khan has regularly taught the ELCT 563 and ELCT 566. He has also introduced a new graduate course ELCT 871 entitled Advances in Semiconductor Devices.

PhD Students

1.	Mr. Jewel Mohiuddin	2023 (Exp)
2.	Mr. M. Kamal Hussain	2023 (Exp)
3.	Mr. Richard Floyd	2022 (Exp)
4.	Mr. Mamun Abdullah	2022 (Exp)
5.	Mr. M. Abu Shahab	2022 (Exp)
6.	Muhtadi Sakib	2017
7.	Sultana Mahbuba	2015
8.	Asif Fatema	2015
9.	Chen Rex	2013
10.	Dion Joe	2011
11.	Islam Monirul	2009
12.	Srivastava Surrendra	2009
13.	Zheng Gong	2007
14.	Li Jaiwei	2007
15.	Rai Shiva	2006
16.	Wu Shai	2004
17.	Saygi Saleh	2004
18.	Tarakji Ahmad	2003
19.	Koudymov Alexi	2003
20.	Chitnis Ashay	2002
21.	Adivarahan Vinod	2001
22.	Hu Xuhong	2001

MS-ME Students

1.	Mahbuba Sultana	MS	2012
2.	Rex Chen	MS	2010
3.	Afroz Shamima	MS	2007
4.	Li Yan	ME	2006
5.	Bushra Ismael	ME	2006
6.	Jia Zhongyuan	MS	2006
7.	Mandavilli Vasevi	MS	2003
8.	Husna Fatima	MS	2003
9.	Pachipulusu Radhika	MS	2003
10.	Srinavasan Radhika	MS	2001

In addition to graduating these students, over 30-post doctoral fellows and junior scientist have also acquired their training in Prof. Khan's laboratory.

Service Activities

Institutional and Departmental Service

- Chair, Russell Research Award Committee 2009-2010
- Chair, College Faculty Awards Committee 2009-2010
- Member, Russell Research Award Committee 2007-2008
- Chair, College Committee on Named Professorships Jan-Dec 2008
- Member, University FEI Hiring Committee 2007
- Member of CEC Dean Search Committee 2015

- Chair EE Department T&P Committee

Professional

- Co-chair, International Workshop on Nitride Semiconductors, International Advisory and Program Committee, Jan-December 2010
- Member, International Workshop on Nitride Semiconductors, International Advisory and Program Committee, Jan-Dec 2008
- Chair, International Symposium on Blue Light Emitting Diodes, Jan-Dec 2008
- Member, International Solid-State Lighting Symposium, Program & Organizing. Committee Jan-Dec 2008
- Chair, Program Committee, International Symposium on Semiconductor Light Emitting Devices 2008
- Member, International Advisory Committee, International Conference on Nitride Semiconductors 2006-present.
- Honoraray Chair, ICNS Washington DC 2012
- Member International Advisory Committee for ICNS, IWN and ISGN the three premier conferences in the III-Nitride Research area. These meetings attract well over 1500 participants each year. 2006-now.