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Pakistan

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Researcher ID: AAM-3033-2020

EDUCATION

- **Ph.D – Electrical & Electronic Engineering**
2014 – 2018
RMIT University, Australia
Thesis Title: Tuning resistive switching in complex oxide memristors
- **M.Sc – Electrical Engineering**
Microtechnology
2008 – 2010
Chalmers University of Technology, Sweden
Thesis Title: Growth and characterization of multiferroic BiFeO₃ thin films
- **M.Sc – Electronics**
2004 – 2007
University of Peshawar
Pakistan

APPOINTMENTS

- **Research Fellow**
2018 – 2020
School of Engineering
RMIT University, Australia
- **Development Engineer**
2013 – 2014
Department of Physics
Lahore University of Management Sciences (LUMS),
Pakistan
- **Research Assistant**
2011 – 2013
Micro- and Nano- Scale Engineering
Department of Mechanical Engineering, Eindhoven
University of Technology, The Netherlands
- **Research Assistant**
2010 – 2011
Terahertz and Millimeter Wave Laboratory
Department of Microtechnology and Nanoscience
Chalmers University of Technology, Sweden

PUBLICATION SUMMARY

- **Patents / Disclosures** 3 / 2
- **Journal articles**
First-authored: 11
Contributing-authored: 30
- **h-index / Citations** 18 / 1074 ([Google Scholar](#): March 02, 2021)

PATENTS

3. **T. Ahmed**, S. Walia, M. Bhaskaran and S. Sriram, “*Multifunctional and multi-bit storage resistive memories*” **Australian Provisional Patent**, WO2018006131, [AU2016902654](#) (2017).
2. **T. Ahmed**, S. Walia, M. Bhaskaran and S. Sriram, “*Sensor and method for discriminating between wavelength regions using the sensor*” **Australian Provisional Patent**, [AU2018902291](#) (2018).
1. **T. Ahmed**, S. Walia, M. Bhaskaran, S. Sriram, G. Perera and M. Doering, “*Sensor for detecting a bioanalyte and a method for the detection thereof*” **Australian Provisional Patent**, 2019904865 (Filed: December 20, 2019).

DISCLOSURES

2. **T. Ahmed**, G. Perera, S. Walia, M. Bhaskaran, S. Sriram, “*Conductometric biosensor for point mutant nucleic acid sequences identification as a cancer DNA detection method*” **Under review** March 2020.
1. **T. Ahmed**, S. Walia, M. Bhaskaran and S. Sriram, “*Fully light controlled memory for in-pixel image processing and neural network*” **Under review** May 2020.

FIRST-AUTHORED JOURNAL ARTICLES (* equal contribution)

11. **T. Ahmed**, M. Tahir, M. X. Low, Y. Ren, S. A. Tawfik, E. L. H. Mayes, S. Kuriakose, S. Nawaz, M. J. S. Spencer, H. Chen, M. Bhaskaran, S. Sriram, S. Walia, “*Fully Light-Controlled Memory and Neuromorphic Computation in Layered Black Phosphorus*”. **Advanced Materials** 2004207 (2020). **Impact Factor: 27.8**
10. **T. Ahmed**, S. Kuriakose, S. Abbas, M. Spencer, A. Rahman, M. Tahir, Y. Lui, P. Sonar, V. Bansal, M. Bhaskaran, S. Sriram, S. Walia, “*Multifunctional optoelectronics via harnessing defects in layered black phosphorus*” **Advanced Functional Materials** 1901991 (2019). **Impact Factor: 15.62**

Selected as **Back Cover** for September 2019 issue (vol 29, issue 39)

Highlighted in **18** international news/media outlets

9. **T. Ahmed**, S. Kuriakose, E. Mayes, R. Ramanathan, V. Bansal, M. Bhaskaran, S. Sriram, S. Walia, “*Optically stimulated artificial synapse based on layered black phosphorus*” **Small** 15 (22) (2019). **Impact Factor: 10.85**

Highlighted in **12** international news/media outlets

8. **T. Ahmed**, S. Walia, E. L. H. Mayes, R. Ramanathan, V. Bansal, M. Bhaskaran, S. Sriram, O. Kavehei, "*Time and rate dependent synaptic learning in neuro-mimicking resistive memories*" **Scientific Reports** 9, 1-11 (2019). **Impact Factor: 4.12**
7. S. Nirantar, **T. Ahmed***, G. Ren, P. Gutruf, C. Xu, M. Bhaskaran, S. Walia, S. Sriram, "*Metal–Air Transistors: Semiconductor-free field-emission air-channel nanoelectronics*" **Nano Letters** 18 (12) (2018). **Impact Factor: 12.34**
6. **T. Ahmed**, S. Walia, E. L. H. Mayes, R. Ramanathan, P. Guagliardo, V. Bansal, M. Bhaskaran, J. Yang, S. Sriram, "*Inducing tunable resistive switching behavior in a single memristor*" **Applied Materials Today** 11, 280-290 (2018). **Impact Factor: 8.35**
5. S. Kuriakose, **T. Ahmed***, S. Balendhran, G. Collis, V. Bansal, I. Aharonovich, S. Sriram, M. Bhaskaran, S. Walia, "*Effects of plasma-treatment on the electrical and optoelectronic properties of layered black phosphorus*" **Applied Materials Today** 12, 244-249 (2018). **Impact Factor: 8.35**
4. **T. Ahmed**, S. Walia, J. Kim, H. Nili, R. Ramanathan, E. L. H. Mayes, D. W. M. Lau, O. Kavehei, V. Bansal, M. Bhaskaran, S. Sriram "*Transparent amorphous strontium titanate resistive memories with transient photo-response*" **Nanoscale** 9 (38) (2017). **Impact Factor: 7.23**
3. **T. Ahmed**, S. Balendhran, M. N. Karim, E. L. H. Mayes, M. R. Field, R. Ramanathan, M. Singh, V. Bansal, S. Sriram, M. Bhaskaran, S. Walia, "*Degradation of black phosphorus is contingent on UV–blue light exposure*" **npj 2D Materials and Applications** 1(1) (2017). **Impact Factor: 9.33**
2. H. Nili, **T. Ahmed***, S. Walia, R. Ramanathan, S. Rubanov, J. Kim, O. Kavehei, V. Bansal, M. Bhaskaran, S. Sriram "*Microstructure and dynamics of vacancy-induced nanofilamentary switching network in donor doped SrTiO_{3-x} memristors*" **Nanotechnology** 4 (50) (2016). **Impact Factor: 3.55**
1. **T. Ahmed**, A. Vorobiev, S. Gevorgian "*Growth temperature dependent dielectric properties of BiFeO₃ thin films deposited on silica glass substrates*" **Thin Solid Films** 520 (13) (2012). **Impact Factor: 2.03**

CONTRIBUTING-AUTHORED JOURNAL ARTICLES

30. S. Kuriakose, R. Vasudevan, **T. Ahmed**, C. Xu, S. Sriram, M. Bhaskaran, S. Balendhran, S. Walia, "*Charge injection in vertically stacked multi-layer black phosphorus*" **Applied Materials Today** 18 (2020). **Impact Factor: 8.35**
29. Md. A. Rahman, S. Abdulkader, **T. Ahmed**, M. Spencer, S. Walia, S. Sriram, M. Bhaskaran, "*Differential work-function enabled bifunctional switching in strontium titanate flexible resistive memories*" **ACS Applied Materials & Interfaces** 12 (6) (2020). **Impact Factor: 8.45**

28. R. Sagar, B. Shabbir, M. Hasnain, N. Mahmood, H. Zeb, B. Shivananju, **T. Ahmed**, I. Qasim, I. Malik, Q. Khan, "Large magnetotransport properties in mixed-dimensional van der Waals heterostructures of graphene foam" **Carbon** 159 (2020). **Impact Factor: 7.46**
27. A. Jannat, Q. Yao, A. Zavabeti, N. Syed, B. Zhang, **T. Ahmed**, S. Kuriakose, Md. Mohiuddin, N. Pillai, F. Haque, G. Ren, D. Ming Zhu, N. Cheng, Y. Du, S. Tawfik, M. Spencer, B. Murdoch, L. Wang, C. McConville, S. Walia, T. Daeneke, L. Zhug, J. Ou, "Ordered-vacancy-enabled indium sulphide printed in wafer-scale with enhanced electron mobility" **Materials Horizons** 7 (3) (2020). **Impact Factor: 14.35**
26. S. Nirantar, E. Mayes, Md. A Rahman, **T. Ahmed**, Md.Taha, M. Bhaskaran, S. Walia, S. Sriram, "In-situ nanostructural analysis of volatile threshold switching and non-volatile bipolar resistive switching in mixed-phased $a\text{-VO}_x$ asymmetric crossbars" **Advanced Electronic Materials** 5 (12) (2019). **Impact Factor: 6.31**
25. S. Nirantar, **T. Ahmed**, M. Bhaskaran, J.W. Han, S. Walia, S. Sriram, "Electron emission devices for energy-efficient systems" **Advanced Intelligent Systems** 1 (4) (2019). **Impact Factor: Yet to be announced**

Selected as **Cover Article** for August 2019 issue (vol 1, issue 4)

24. Arash, **T. Ahmed**, A. Rajan, S. Walia, F. Rahman, A. Mazumder, R. Ramanathan, S. Sriram, M. Bhaskaran, E. Mayes, M. Strano, S. Balendhran, "Large-area synthesis of 2D MoO_{3-x} for enhanced optoelectronic applications" **2D Materials** 6 (3) (2019). **Impact Factor: 7.34**
23. J. Kim, H. Nili; N. Truong, **T. Ahmed**, J. Yang, D. Jeong, S. Sriram; D. Ranasinghe, S. Ippolito, H. Chun, O. Kavehei, "Nano-intrinsic true random number generation: A device to data study" **IEEE Transactions on Circuits and Systems I: Regular Papers** 66 (7) (2019). **Impact Factor: 3.93**
22. E. Gaspera, J. Griggs, **T. Ahmed**, S. Walia, E. Mayes, A. Calzolari, A. Catellani, J. Embden, "Augmented band gap tunability in indium-doped zinc sulfide nanocrystals" **Nanoscale** 11 (7) (2019). **Impact Factor: 7.23**
21. F. Rahman, **T. Ahmed**, S. Walia, E. Mayes, S. Sriram, M. Bhaskaran, S. Balendhran, "Reversible resistive switching behaviour in CVD grown, large area MoO_x " **Nanoscale** 10 (42) (2018). **Impact Factor: 7.23**

Selected as **Cover Article** for August 2018 issue (vol 10, issue 42)

20. S. Kuriakose, **T. Ahmed**, P. Taylor, Y. Zhu, M. Spencer, S. Balendhran; Y. Lu, V. Bansal, S. Sriram, M. Bhaskaran, "Generating strong room-temperature photoluminescence in black phosphorus using organic molecules" **2D Materials** 6 (1) (2018). **Impact Factor: 7.34**
19. A. Rahman, **T. Ahmed**, S. Walia, S. Sriram, M. Bhaskaran, "Oxygen-deficient strontium titanate based stretchable resistive memories" **Applied Materials Today** 13 (2018). **Impact Factor: 8.35**
18. S. Kuriakose; **T. Ahmed**, S. Balendhran, G. Collis, V. Bansal, I. Aharonovich, S. Sriram, M. Bhaskaran, S. Walia, "Effects of plasma-treatment on the electrical and optoelectronic

properties of layered black phosphorus” **Applied Materials Today** 12 (2018).
Impact Factor: 8.35

17. J. Kim, **T. Ahmed**, H. Nili, J. Yang, D. Jeong, P. Beckett, S. Sriram, D. Ranasinghe, O. Kavehei, “*A physical unclonable function with redox-based nanoionic resistive memory*” **IEEE Transactions on Information Forensics and Security** 13 (2) (2018). **Impact Factor: 6.21**
16. S. Kuriakose; **T. Ahmed**, S. Balendhran, V. Bansal, S. Sriram, M. Bhaskaran, S. Walia, “*Black phosphorus: ambient degradation and strategies for protection*” **2D Materials** 5 (3) (2018) **Impact Factor: 7.34**
15. M. Mohammadtaheri, R. Ramanathan, S. Walia, **T. Ahmed**, P. Weerathunge, S. Anderson, M. Field, C. Dekiwadia, A. O’Mullane, E. Gaspera, M. Bhaskaran, S. Sriram, V. Bansal “*Broadband light active MTCNQ-based metal–organic semiconducting hybrids for enhanced redox catalysis*” **Applied Materials Today** 13 (2018). **Impact Factor: 8.35**
14. K. Messalea, B. Carey, A. Jannat, N. Syed, M. Mohiuddin, B. Zhang, A. Zavabeti; **T. Ahmed**, N. Mahmood, E. Gaspera, K. Khoshmanesh, K. Kalantarzadeh, T. Daeneke, “*Bi₂O₃ monolayers from elemental liquid bismuth*” **Nanoscale** 10 (33) (2018). **Impact Factor: 7.23**
13. C. Elbadawi, R. Queralt, Z. Xu, J. Bishop, **T. Ahmed**, S. Kuriakose, S. Walia, M. Toth, I. Aharonovich; C. Lobo, “*Encapsulation-free stabilization of few-layer black phosphorus*” **ACS Applied Materials & Interfaces** 10 (29) (2018). **Impact Factor: 8.45**
12. S. Walia, S. Balendhran, **T. Ahmed**, M. Singh, C. El-Badawi, M. D Brennan, P. Weerathunge, M. Karim, F. Rahman, *et al.* “*Ambient protection of few-layer black Phosphorus via sequestration of reactive oxygen species*” **Advanced Materials** 29 (2017). **Impact Factor: 27.3**
11. F. Rahman, **T. Ahmed**, S. Walia, E. Mayes, S. Sriram, M. Bhaskaran, S. Balendhran, “*Two-dimensional MoO₃ via a top-down chemical thinning route*” **2D Materials** 4 (3) (2017). **Impact Factor: 7.34**
10. M. Taha, S. Walia, **T. Ahmed**, D. Headland, W. Withayachumnankul, S. Sriram, M. Bhaskaran, “*Insulator-metal transition in substrate-independent VO₂ thin film for phase-change devices*” **Scientific Reports** 7 17899 (2017). **Impact Factor: 4.12**

Highlighted in 10 international news/media outlets

9. M. Singh, E. Gaspera, **T. Ahmed**, S. Walia, R. Ramanathan, J. Embden, E. Mayes, V. Bansal, “*Soft exfoliation of 2D SnO with size-dependent optical properties*” **2D Materials** 4 (2) (2017). **Impact Factor: 7.34**
8. Karim, Md Nurul; M. Singh, P. Weerathunge, P. Bian, R. Zheng; C. Dekiwadia, **T. Ahmed**, S. Walia, E. Gaspera, M. Singh, R. Ramanathan, V. Bansal, “*Visible-light-triggered reactive-oxygen-species-mediated antibacterial activity of peroxidase-mimic CuO nanorods*” **ACS Applied Nano Materials** 1 (4) (2018). **Impact Factor: Yet to be announced**

7. D. La, R. Ramanathan; D. Kumar, **T. Ahmed**, S. Walia, K. Berean, S. Bhosale, V. Bansal; "Galvanic replacement of semiconducting CuTCNQF4 with Ag⁺ ions to enhance electron transfer reaction" **ChemistrySelect** 2 (31) (2017). **Impact Factor: 1.81**
6. Siu, Mark C; Anderson, Samuel R; M. Mohammadtaheri; **T. Ahmed**, S. Walia, R. Ramanathan, V. Bansal, "Charge transfer complexes: role of water in the dynamic crystallization of cutcnq for enhanced redox catalysis (TCNQ= Tetracyanoquinodimethane)" **Advanced Materials Interfaces** 4 (15) (2017). **Impact Factor: 4.94**
5. T. Daeneke; P. Atkin, R. Orrell-Trigg, A. Zavabeti; **T. Ahmed**, S. Walia, M. Liu, Y. Tachibana, M. Javaid, A. Greentree, S. Russo, R Kaner, K. Kalantarzadeh "Wafer-scale synthesis of semiconducting SnO monolayers from interfacial oxide layers of metallic liquid tin" **ACS Nano** 11 (11) (2017). **Impact Factor: 14.58**
4. C. Zou, G. Ren, Md. M. Hossain, S. Nirantar, W. Withayachumnankul, **T. Ahmed**, M. Bhaskaran, S. Sriram, M. Gu, C. Fumeaux, "Metal-loaded dielectric resonator metasurfaces for radiative cooling" **Advanced Optical Materials** 5 (20) (2017). **Impact Factor: 8.28**
3. S. Walia, Y. Sabri, **T. Ahmed**, M. Field, R. Ramanathan, A. Arash, S. Bhargava, S. Sriram, M. Bhaskaran, V. Bansal, S. Balendhran, "Defining the role of humidity in the ambient degradation of few-layer black phosphorus" **2D Materials** 4 (1) (2016). **Impact Factor: 7.34**
2. R. Clark, J. Kotsakidis, B. Weber, K. Berean, B. Carey, M. Field, H. Khan, J. Ou, **T. Ahmed**, C. Harrison, I. Cole, K. Latham, K. Kalantarzadeh, T. Daeneke, "Exfoliation of quasi-stratified Bi₂S₃ crystals into micron-scale ultrathin corrugated nanosheets" **Chemistry of Materials** 28 (24) (2016). **Impact Factor: 9.56**
1. H. Nili, S. Walia, A. Kandjani, R. Ramanathan, P. Gutruf, **T. Ahmed**, S. Balendhran, V. Bansal, D. Strukov, O. Kavehei, M. Bhaskaran, S. Sriram, "Donor-induced performance tuning of amorphous SrTiO₃ Memristive Nanodevices: multistate resistive switching and mechanical tunability" **Advanced Functional Materials** 25 (21) (2015). **Impact Factor: 15.62**

RESEARCH TRANSLATION & INDUSTRIAL ENGAGEMENT

- **Piezoelectric Micro-Machined Ultrasonic Transducer Array**

Aim: Developing piezoelectric micro-machined ultrasonic transducer arrays for integration with balloon catheters for imaging applications

Funder: Stelect Pty Ltd (AU\$223,600.00)

Role: Co-Principal Investigator

Years: 07/02/2020 – 30/06/2021
- **Smart Patches for Pro-active Aged-care Support**

Aim: Developing wearable patches for monitoring health and environmental parameters

Funder: Vlepis Pty Ltd (AU\$420,000.00)

Role: Co-Principal Investigator

Years: 09/06/2020 – 13/04/2021

TEACHING & SUPERVISION

- **Supervision/Co-supervision**
School of Engineering, RMIT University
(2018 – To date)
PhD candidates: 3 (currently enrolled)
M.Sc students: 5 (completed), 2 (currently enrolled)
- **Face-to-Face Teaching**
School of Engineering, RMIT University
(2019 – 2020)
MicroNanoSystems, MEMS and NEMS
(EEET2379/EEET2044)
Good Teaching Score (GTS): 99.1%
- **Course Coordination**
School of Engineering, RMIT University
(2019 – 2020)
MicroNanoEngineering Minor/Major Project
(EEET2431/EEET2435)
Overall Satisfactory Index (OSI): 100%
- **Course Coordination**
School of Engineering, RMIT University
(2019 – 2020)
Research Project/Research Project Part 1/2
(EEET2312/EEET2313/EEET2314)
Overall Satisfactory Index (OSI): 90%
- **Lab Tutoring/Demonstration**
School of Engineering, RMIT University
(2015 – 2018)
Electronic Materials/MicroNanoSystems, MEMS and NEMS
(EEET2148/EEET2379/EEET2044)
Good Teaching Score (GTS): 88.6%
- **Lab Demonstration**
Department of Physics, LUMS Pakistan
(2013)
Lab-I/Lab-II
(PHY 100/200/300)

AWARDS & MEDIA HIGHLIGHTS

- Australian Nanotechnology Network (ANN) Overseas Travel Fellowship 2019
- RMIT Recognition of Outstanding Student Experience (Teaching Team) Award 2019

- Best Poster Award, 4th International Conference on 2D Materials & Technologies, 10-13 December 2018, Melbourne, Australia
- RMIT Higher Degree by Research Publication Grant, 2017-2018
- RMIT Functional Materials and Microsystems Prize, 2017
- Media coverage
 - TV, radio, newspaper and magazine interviews ([7 News](#), [Radio Adelaide](#), [SBS Urdu](#), [Create](#) etc)
 - [Optoelectronic research](#) – appeared in more than 18 media outlets worldwide
 - [Biosensors research](#) – covered by more than 65 media outlets worldwide