Curriculum Vitae Rajesh Kumar Ulaganathan

Assistant Professor (Grade-I)

Centre for Nanotechnology
Indian Institute of Technology Roorkee (IITR), Roorkee-247667, Uttarakhand, India
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Scientific Expertise

Nanofabrication Skills

- Experienced in the operation of lithography systems including the **JEOL 9500FS** *Electron Beam Lithography* and *photolithography* such as the **MLA 150 Maskless Aligner** and **Mask Aligner EVG-620**, along with proficiency in **Shadow Mask Patterning**. Skilled in working within Clean Room environments spanning from **Class 10-100 to 100-1000.**
- Demonstrated expertise in device fabrication, leveraging a diverse range of **van der Waals two-dimensional (2D) materials,** including Transition Metal Dichalcogenides (TMDs), Indium Selenide (InSe), Germanium Sulfide (GeS), ternary materials like Hafnium Sulfoselenide (HfSSe), **2D perovskites**, **Nanoribbons** (MoS_2), **Nanowires** (Silicon Nanowire), and **Quantum dots**.
- Proficient in the exfoliation of 2D materials, adept at **stacking multi-2D van der Waals heterostructures**, and skilled in the **transfer of 2D materials** onto versatile substrates.

Device Designs and Knowledge

- Proficient in designing and fabricating **Field-Effect Transistors (FET)**, **Photodetectors (PDs)**, for optoelectronic applications.
- Experienced in creating **Flexible Devices** with an emphasis on bendable and stretchable electronics.
- Familiar with the design and implementation of **FET-Biosensors** for biomedical sensing applications.
- Knowledgeable in the design and fabrication of **Photovoltaic devices** for efficient energy conversion.

Materials Growth Ability and Instruments Familiarity

- Experienced in **Chemical Vapor Transport (CVT)**, **Bridgman Techniques** for the Growth of Single Crystalline 2D Materials.
- Operated the **Chemical Vapor Deposition (CVD)** and **Pulsed Laser Deposition (PLD)** techniques for the growth of MoS_2 nanoribbons and thin films.
- Skilled in **Solution Growth** techniques for the synthesis of **2D Perovskite materials**.
- Conducted **Cryogenic Probe Measurements** for analyzing electronic properties at low temperatures.
- Worked on **Source Measure Units** for comprehensive **electrical and optical property analysis**.
- Operated equipment of **E-beam and Thermal Evaporator** for thin film coatings.
- Proficient in **Atomic Force Microscopy** for surface imaging and characterization.
- Skilled in **Scanning Electron Microscopes** for detailed structural and elemental analysis.
- Conducted **Photoluminescence and Raman Spectroscopy** experiments for material characterization and optical property analysis.

Research Interest

- Development and **Single Crystal Growth of Novel 2D Materials** and **2D Perovskites**.
- van der Waals **stacking of 2D Materials** for **p-n junction devices**.
- Advanced processing of 2D materials for technological applications includes **Transistors, Photodetectors, Photovoltaics, and Sensors.**
- **Flexible, lightweight, and foldable electronics**, with 2D-based materials, for energy and environmental applications.
- **Cost-effective** and **stable 2D Devices**.

Professional Experiences

(Research: 9.10 Years/Teaching: 1.9 Years)

Current Position

Assistant Professor Grade-I, (1.9 Y) — **India**
Head of Nanomaterials and Devices Laboratory (NANOMADE)
Centre for Nanotechnology, Indian Institute of Technology Roorkee (IITR) — Sep.2024-Present
Full-Time Research: Growth of Novel Low-Dimensional Materials and their Device Applications
Teaching: NTL-506_Nanoscale Fabrication Techniques, NTC-505_Emerging applications of Nanomaterials, NTS-501_Safety and Ethics in Nanotechnology Research, NTC-700_Seminar

Previous Employment: (8.1 Y)

Research Specialist (1.3 Y), ***Novel Material Development and Crystal Growth*** — **Taiwan**
Institute of Physics, Academia Sinica (AS) — Jun.2023-Aug.2024
Full-Time Research: Growth of Novel Low-Dimensional Materials and their Applications in Optoelectronic Devices.
Teaching: Experimental and Theoretical (Science & Practices of Single Crystal Growth) to Ph.D. Students

Senior Postdoctoral Researcher (2.2 Y), ***Photovoltaic Materials and Systems Group*** — **Denmark**
Department of Electrical and Photonics Engineering, Technical University of Denmark QS = **107** — Apr.2021-May.2023
Full-Time Research: Integration of 2D-TMDs and their Heterostructures in Novel Optoelectronic Devices.
Co-supervision: Thesis works of Master and Bachelor Students.

Postdoctoral Researcher (2.8 Y), ***Novel Single Crystal Materials Group*** — **Taiwan**
Center for Condensed Matter Sciences, National Taiwan University QS = **63** — Aug.2018-Mar.2021
Full-Time Research: Emergent Materials Development and Crystal Growth for Energy Applications.

Postdoctoral Researcher (1 Y), ***Nanomaterials and Devices Group*** — **Taiwan**
Department of Materials Science and Engineering, National Taiwan University QS **= 63** — Aug.2017-Jul.2018
Full-Time Research: Novel 2D Atomic Materials for Energy Research Platform: Material Synthesis, Device Fabrication, and Mechanism Research.

Postdoctoral Researcher (1 Y), ***Nanoscale Materials and Bioanalytical Chemistry Group*** — **Taiwan**
Department of Chemistry, National Taiwan University QS = 63 — Aug.2016-Jul.2017
Full-Time Research: Innovation Application and Design of Devices with New One-dimensional and 2D Nanomaterials.

Education

Doctor of Philosophy (Ph.D.) – CHEMISTRY/NANOSCIENCE AND TECHNOLOGY — **Taiwan**
Department of Chemistry, National Taiwan University QS = 63
TIGP-Nanoscience & Technology Program, Institute of Physics, Academia Sinica — Sep.2010-Jun.2016

Thesis Entitled: "*Novel two-dimensional materials and their Applications in Transistors, Photodetectors, and Light-Emitting Devices*" **(Supervisor: Prof. Yit-Tsong Chen).**
Awarded: Popular Poster Award for Thesis

Master of Technology (M.Tech.) – NANOTECHNOLOGY **India**
Centre for Nanotechnology, Indian Institute of Technology Roorkee QS = 339 Sep.2008-Jun.2010

Thesis Entitled: *"Semiconductor Nanoparticles and their Interaction with Organic Dyes"* **(Supervisor: Prof. K. R. Justin Thomas)**
Cleared GATE: Graduate Aptitude Test in Engineering for Technical Postgraduate Programs.

Bachelor of Technology (B.Tech.) – BIOTECHNOLOGY **India**
Department of Biotechnology, Anna University QS = 465 Sep.2004-May2008
Awarded: Distinction with First Class

Honors & Awards

2026 Best Researcher Award, Engineering Faculty Award	AMET University, India
2025 Young Scientist Award, Bio-Heal International Conference	Bioheal, IIT Roorkee
2025 PM-ECRG, Prime Minister Early Career Research Grant (Grant INR₹-67.55 Lakhs)	ANRF, India
2024 New Faculty Fellowships, IIT Roorkee	IIT Roorkee
2024 Plum Blossom Card, Permanent Resident Status, Senior Professionals needed by Taiwan	NIA, Taiwan
2024 Junior Research Investigators, Research Paper Award (Public Talk, Medal, and Grant NT$-100000)	IoP, Taiwan
2022 Inspire Faculty Award, Independent Research Starting Grant	DST, India
2021 Global Talent Award, Skilled Researcher (Taiwan Golden VISA Entry)	TGC, Taiwan
2020 Honorable Mention Award, Best Poster Presentation (Certificate)	NTU, Taiwan
2019 Young Researcher Award, Researcher Award (Certificate, Medal, & Grant NT$-5000)	TTS, Taiwan
2017 Visiting Grant, Researcher Travel Grant (Grant NT$-80000)	MOST, Taiwan
2016 Popular Poster Award, Ph.D. Best Thesis Poster Presentation (Certificate)	NTU, Taiwan
2016 Travel Grant, Student International Travel Grant (Grant NT$-60000)	AS, Taiwan
2008 Distinction Award, Excellence in Undergraduate Program (Certificate)	AU, India
2004 Gold Medal, Secure High Marks in Higher Secondary Examination (Gold Coin)	India

Fellowships

2021 IRF- Postdoctoral Fellowship, Independent Research Fund, Sapere Aude.	IRF, Denmark
2016 NSTC- Postdoctoral Fellowship, National Science & Technology Council.	NSTC, Taiwan
2010 Taiwan Scholarship, To Pursue a Doctorate.	MoE, Taiwan
2010 TIGP Fellowship, To Pursue a Doctorate.	AS, Taiwan
2008 MHRD Fellowship, To Pursue a Postgraduate.	MHRD, India
2005 Tamil Nadu Chief Minister Award, Excellence in Higher Secondary Examination	GoTN, India

[NIA- National Immigration Agency, IoP- Institute of Physics, AS- Academia Sinica, TGC- Taiwan Gold Card, NTU- National Taiwan University, TTS- Taiwan Tamil Sangham, MOST- Ministry of Science and Technology, NSTC- National Science and Technology Council, IRF- Independent Research Fund, MHRD- Ministry of Human Resource and Development, DST- Department of Science and Technology, PM-ECRG- Prime Minister Early Career Research Grant, ANRF- Anusandhan National Research Foundation, MoE- Ministry of Education, AU-Anna University, and GoTN- Government of Tamil Nadu]

Editorial Roles & Academic Memberships

2026 Topic Editor, Thought Leaders in Coatings, Dyes and Interface Engineering Research	Frontiers, Switzerland
2025 Associate Editor, Frontiers in Coatings, Dye & Interface Engineering	Frontiers, Switzerland
2025 Editorial Board Members, Scientific Reports	Nature Portfolio, UK
2024 Associate Editor, RW Materials	Research Wheel Publishers, India
2026 Life Member, Chemical Research Society of India	MRSI, India

2026 Life Member, Materials Research Society of India — MRSI, India
2026 Life Member, Semiconductor Society (India) — SSI, India
2026 Senior Member, Indian National Academy of Engineering — INAE, India
2025 Life Member, Indian Society for Technical Education — ISTE, India
2025 Life Member, Sustainable Biomanufacturers and Research Society — SBRS, India

Administrative & Academic Responsibilities

2026 Convener, Centre Faculty Selection Committee (CFSE) — IIT Roorkee
2025 Member, Institute Disposal Committee (IDC) — IIT Roorkee
2025 Member, Sponsored Research & Industrial Consultancy (SRIC) — IIT Roorkee
2025 Ranking Officer, Centre for Nanotechnology — IIT Roorkee
2024 Member Secretary, Centre Faculty Committee (CFC) — IIT Roorkee
2024 Representative, Student Wellness Centre — IIT Roorkee

Ongoing Projects

Sr. No.	Title of the project	Role (PI/Co-PI)	Funding Agency and Duration	Grand Amounts (₹)
1	Cost-effective, Scalable, and Reproducible 2D Hybrid Perovskites for High-Efficient Transistor and Photodetector Technologies.	**PI**	**PM-ECRG, ANRF (2025-2028)**	₹67.57 Lakhs
2.	Emerging van der Waals Heterostructures for Flexible, Lightweight, and Efficient Optoelectronic Devices	**PI**	**IRG, ANRF (2026-2029)**	₹67.88 Lakhs
3.	2D Hybrid Perovskite Crystals: A Scalable Solution for High Performance Transistor and Photodetector Devices.	**PI**	**CRS, UGC-DAE (2025-2026)**	In-house facilities of Kalpakkam Node & Mobility Expenses
4.	2D Indium Selenide Nanosheets and their Potential Opto-Electronic Applications.	**PI**	**FIG, IITR (2025-2027)**	₹20 Lakhs
5.	First-in-the-World Challenge, A prototype in Biosensing Commercial Scale-Up of a Portable Potentiostat Platform for Non-invasive Multiplexed Salivary Diagnosis and Prognosis of Oral and Lung Cancer	**Co-PI**	**ICMR (2026-2029)**	₹ ~4 Crores

[PM-ECRG- Prime Minister Early Career Research Grant, IRG- Inclusivity Research Grant, ANRF- Anusandhan National Research Foundation, CRS- Collaborative Research Scheme, UGC- University Grants Commission, DAE- Department of Atomic Energy, FIG- Faculty Initiation Grant, IITR- Indian Institute of Technology Roorkee, ICMR- Indian Council of Medical Research]

Invited Talks, Seminars & Lectures

2025 *"2D Phototransistors as Emerging Platforms for Advanced Biosensing"*
Biomaterials and Healthcare (Bioheal-2025) @ IIT Roorkee — India
2025 *"Challenges, Sustainability and AI/ML Technologies in Polymer and Petrochemical Sectors* ***(CSATPP)*** *@ IIT Roorkee, Saharanpur Campus* — India

2025 *"3rd International Conference on Energy, Functional Materials/Molecules and Nanotechnology (**ICEFN**) @ Kumaun University, Nainital* India
2025 *"Nanomaterials in Optoelectronic Devices"*, IIT-ISM Dhanbad [Malaviya Mission Teacher Programme] India
2024 *"2D Materials in Optoelectronic Devices"*, IIT-ISM Dhanbad [Faculty Development Program] India
2024 *"van der Waals Stacking of 2D materials"*, Anna University India
2024 *"Challenges and Opportunities in 2D Material"*, Indian Institute of Technology Bombay India
2023 *"2D Materials and its Future"*, Korea Tech South Korea
2023 *"Low-Dimensional Materials and its Application"*, Indian Institute of Technology Kharagpur India
2022 *"2D Innovations in Next-Generation Devices"*, Indian Institute of Technology Jodhpur India
2022 *"Nanoscience and Nanotechnology"*, Chung Yuan Christian University Taiwan
2021 *"Atomically Thin Material for High-Performance Optoelectronic Devices"*, Indian Institute of Science India
2021 *"Graphene and its Future Electronic Devices"*, Chung Yuan Christian University Taiwan
2021 *"Light and Matter Interaction in Novel 2D Atomically Thin Films"* Skoltech Russia
2020 *"Growth of Single Crystals: Vapor, Liquid, Solid Phase"*, Chung Yuan Christian University Taiwan

International Collaborators

Associate Research Scientist **Raman SANKAR,** Academia Sinica Taiwan
Professor **Xuan GAO**, Case Western Reserve University U.S.A.
Reader **Alex ROZHIN** and **Raghavan MURUGESAN**, Aston University U.K.
Senior Researcher **Stela Canulescu** and **Ganesh Ghimirie**, Technical University of Denmark Denmark

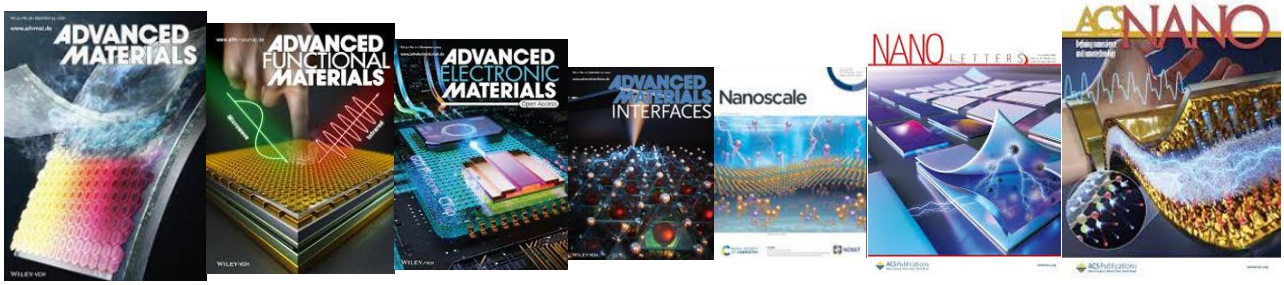
International Visits

Case Western Reserve University, Department of Physics, Ohio U.S.A.
MRS Spring Meeting and Exhibit, Phoenix, Arizona U.S.A.
International Nanotechnology Conference and Expo, Baltimore U.S.A.
International Conference and Expo on Nanoscience & Molecular Nanotechnology, Rome Italy
SF Nano Annual Meeting, Paris France
4th European Congress on Graphene & 2D Materials, Paris France
Korea Tech, Department of Mechatronics South Korea

Journal Peer-Reviewer

Nature Communication (IF- 15.7) Nature Portfolio
Communication Materials (IF- 9.6) Nature Portfolio
ACS Applied Material & Interfaces (IF- 8.3) ACS Publisher
Nanoscale (IF- 5.8) RSC Publisher
Optik (IF- 3.1) Elsevier Publisher
Applied Physics A (IF- 2.7) Springer Publisher

Research Publications [53 + 4]



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[Citations-3000+, h-index 24 and i10-index 34]

[Advanced Materials (1), Advanced Functional Materials (4), ACS Nano (1), Nano Letters (4), Chemical Engineering Journal (1), ACS Applied & Material Interfaces (6), npj 2D Materials & Applications (2), Nanoscale (6), Advanced Electronic Material (1), ACS Sensors (1), 2D Materials (1), Applied Surface Science (2), Journal of Material Chemistry C (1), Advanced Material Interfaces (1), Bulletin of the Chemical Society of Japan (1), Nanomaterials (1), Materials Advances (1), Physical Review B (5), Scientific Reports (1),Journal of physical Chemistry C (1), Analyst (1), Catalysts (1),Journal of Physics: Condensed Matter (1), Biomicrofluidics (1), & AIP Advances (1)]

1. R. Moqbel, K. R. Vankayala, **R. K. Ulaganathan**, R. Sankar, M.-N. Ou, C.-C. Lee*, K.-H. Lin* "Ferroelastic switching in α-phase few-layer Group-IV monochalcogenides by mechanical forces" ACS Omega, **2026**, **(IF-4.3)**

2. H. K. Bangolla, C.-Y. Chen, C.-M. Cheng, K.-Y. Lee, L.-C. Chao, **R. K. Ulaganathan**, R. Sankar, A. Ghosh, R.-S. Chen, "Spatially Separated Bipolar Transport and Surface Electron Accumulation in Tungsten Diselenide Nanostructures" Nanoscale, **2026**, **(IF-5.1)**

3. C. Zhang, J. Feng, X. Tang, X. Xing, N. Zuo, X. Yi, Y. Meng, X. Zhang, **R. K. Ulaganathan**, R. Sankar, X. Xu, X. Chen, X. Liu, "Pressure-induced reentrant superconductivity in the misfit layered compound $(SnS)_{1.15}(TaS_2)$" Physical Review B **2026**, 113, L140506 **(IF-3.7)**

4. T. Beekmann, K. Shtefienjo, C. Phillips, **R. K. Ulaganathan**, R. Sankar, D. E. Graf, K. Shrestha, "Pressure evolution of quantum oscillations and electronic structure in ZrSiS" Physical Review Materials **2026**, 10, 044202 **(IF-3.4)**

5. P. V. Pham, S. C. Lims, A. Kumar, **R. K. Ulaganathan**, R. I. Stantchev, R. Sankar, "Engineering high-performance IR photodetectors: From material design to multifunctional applications" Chemical Engineering Journal **2025**, 167554 **(IF-13.2)** (Review Article)

6. J. I. Deagueros, M. Gao, A. Cai, X. Li, **R. K. Ulaganathan**, S. Mani, R. Sankar, H. Ishida, X. P. Gao, *"Modulation Doping and Reduced Hysteresis in Monochalcogenide InSe/GaS Heterostructure 2D Field-Effect Transistors"* ACS Applied Materials & Interfaces, **2025**, 17, 35723-35731 **(IF-8.2)**

7. D. Kumar, J. Khatua, N. T. Hoang, Y. Sim, **R. K. Ulaganathan**, R. Kalaivanan, R. Sankar, M.-J. Seong*, K.-Y. Choi*," Manipulation of anisotropic Zhang-Rice exciton in van der Waals antiferromagnets $NiPS_{3-x}Se_x$ by anion substitution *npj 2D Materials & Applications*, **2025**, 9, 87 (**IF-8.8)**

8. S. Choudhury, S. Kalal, **R. K. Ulaganathan**, R. Sankar, S. K. Manatha, *"Interplay of Td and 1T' Phases Influencing the Transport Properties of $MoxW_{1-x}Te_2$ Weyl Semimetals"* The Journal of Physical Chemistry C, **2025**, *129*, 11407–11416. **(IF-3.2)**

9. T.-H. Wu, C.-E. Hsu, **R. K. Ulaganathan**, R. Sankar, Z. Li, C.-C. Lee, C.-S. Chang . Kung-Hsuan Li * *"Anisotropic screening of excitons in van der Waals materials" npj 2D Materials & Applications*, **2025**, 9, 37 (**IF-8.8)**

10. D. Jana, D. Vaclavkova, **R. K. Ulaganathan**, R. Sankar, M. Orlita, C. Faugeras, M. Koperski, M. E. Zhitomirsky, M. Potemski*, *"Strong and selective magnon-phonon coupling in the van der Waals antiferromagnet CoPS3" Physical Review B*, **2025**, 112, 1165427. **(IF-3.7)**

11. D. Kumar, **R. K. Ulaganathan**, R. Kalaivanan, R. Sankar, M.-J. Seong, K.-Y. Choi*, *"Quasi-elastic scattering and spin-phonon coupling in Se-substituted NiPS3" Physical Review Material*, **2025**, 9, 114002. **(IF-3.4)**

12. J. Yan, H. Takeda, H. Iwahata, **R. K. Ulaganathan**, K. Raju, R. Sankar, M. Yamashita, "Field-Angle Dependence of Phonon Thermal Hall Effect in $Na_2X_2TeO_6$ (X=Co, Zn)" *Scientific Reports*, **2025**, 15, 36640 (**IF-3.9)**

13. G. S. Murugan, J. Khatua, S. Kim, E. Mum, K. R. Babu, H.-S. Kim, C.-L. Huang, R. Kalaivanan, **R. K. Ulaganathan**, I. P. Muthuselvam, W. T. Chen, S. Krishnamoorthi,K.-Y. Choi*,R. Sankar* *"Spin dynamics and 1/3 magnetization plateau in the coupled distorted diamond chain compound $K_2Cu_3(MoO_4)_4$" Physical Review B*, **2025**, 111, 144420. **(IF-3.7)**

14. H.-G.Lee, C. H. Koo, Y. G. Choi, Y. Oshima, **R. K. Ulaganathan**, R.Kalaivanan, R. Sankar, K.-Y. Choi*, *"Anomalous spin dynamics and excitations of the quasizigzag chain compound $AgCrP_2S_6$" Physical Review B*, **2025**, 111, 134415. **(IF-3.7)**

15. D. Miertschin, T. Nguyen, S. Zhang, M. Lee, S. Krishnamoorthi, **R. K. Ulaganathan**, R. Sankar, D. E. Graf. K. Shrestha*, *"The dHvA effect in Sn-doped PbTe Topological Crystalline Insulator" Journal of Physics: Condensed Matter*, **2025**, 37, 155501. **(IF-2.6)**

16. J, -H. Lee, S. Lee, Y. Choi, L. Gries, R. Klingeler, K. Raju, **R. K. Ulaganathan**, R. Sankar, M.-J. Seong, K.-Y. Choi, *"Optical Probe of Magnetic Ordering Structure in Mn-substituted $NiPS_3$" Advanced Functional Materials*, **2024**, *2405153*. **(IF-19)** - *"Appeared in Journal Cover Page"*

17. D. Kumar, N. T. Hoang, Y. S. Y. Choi, K. Raju, **R. K. Ulaganathan**, R. Sankar, *"Interplay between Magnetic and Lattice Excitations and Emergent Multiple Phase Transitions in $MnPSe_{3-x}S_x$" Physical Review B*, **2024**, **(IF-3.7)**

18. R. Kalaivanan, B. D. S. Chandana, **R. K. Ulaganathan**, S. M. Ganesan, K.-Y. Choi, I. P. Muthuselvam, R. Sankar*, *"Structural, Magnetic and Electronic Properties of GdAsSe Single Crystal: Experimental and Theoretical Studies" Physical Review B*, **2024**, 109, 184420. **(IF-3.7)**

19. V. Krishnamoorthy, H. K. Bangolla, C.-Y. Chen, Y.-T. Huang, C. M. Cheng, **R. K. Ulaganathan**, R. Sankar, K.- Y. Lee, H.-Y. Du, L.-C. Chen, K.-H. Chen, R.-S. Chen, "Efficient Hydrogen Evolution Reaction in 2H-MoS_2 Basal Planes Enhanced by Surface Electron Accumulation" Catalysts, **2024**, 2302469. **(IF-4)**

20. G. Ghimire, **R. K. Ulaganathan**, A. Tempez, O. Chenko, R. R. Unocic, J. Heske, D. I. Miakota, C. Xiang, M. Chaigneau, K. S. Thygesen,T. Booth, D. B. Geohegan, S. Canulescu, "Quasi 1D MoS_2 Nanoribbons with Enhanced Edge Nonlinear Response and Photoresponsivity" *Advanced Materials*, **2023**, 2302469. **(IF-26.8)**

21. **R. K. Ulaganathan**, P. K. Roy, S. M. Mhatre, R. C. Murugesan, W.-L. Chen, M.-H. Lai, A. Subramanian, C.-Y. Ling, Y.-M. Chang, A. Rozhin, C.-T. Liang, R. Sankar, *"High-Performance Photodetector and Angular-Dependent Random Lasing from Long- Chain Organic Diammonium Sandwiched 2D Hybrid Perovskite Non-linear Optical Single Crystal" Advanced Functional Materials*, **2023**, 2214078. **(IF-19, *Citations-2*)**

22. H. K. Bangolla, M. Y. Fakhri, C.-H. Lin, C.-M. Cheng, Y.-H. Lu, T.-Y. Fu, P. **R. K. Ulaganathan**, R. Sankar, R.-S. Chen*, "Electrical and Optoelectronic Anisotropy and Surface Electron Accumulation in ReS_2 Nanostructures" Nanoscale, **2023**, 15, 19735. **(IF-5.1)**

23. H. K. Bangolla, Y.-C. Lee, W.-C. Shen, **R. K. Ulaganathan**, R. Sankar, H.-Y. Du*, Ruei-San Chen*, "Photoconduction Properties in Tungsten Disulfide Nanostructures" Nanomaterials, **2023**, 13, 2190. **(IF-4.3)**

24. D. I. Miakota, G. Ghimire, **R. K. Ulaganathan**, M E. Rodriguez, S. Canulescu, "A novel Two-step Route to Unidirectional Growth of Multilayer MoS_2 Nanoribbons" Applied Surface Sciences, 2023, 619, 156748. **(IF-6.9, Citations-5)**

25. **R. K. Ulaganathan***, R. C. Murugesan* C. -Y. Lin, A. Subramanian, W.-L. Chen, Y.-M. Chang, A. Rozhin and R. Sankar*, *"Stable Formamidinium Based Centimeter Long Two-Dimensional (2D) Lead Halide Perovskite Single Crystal for Long-Live Optoelectronic Application" Advanced Functional Materials*, **2022**, *32*, 2112277. **(IF-19, *Citations-11*)**

26. C.-Y. Lin, **R. K. Ulaganathan***, A. Subramanian, H.-C. Weng, Y.-J. Chang, R. C. Murugesan, R. Sankar, and A. Rozhin, *"Extended Air, Light, and Heat Resistive Organolead Halide Perovskite Single-Crystalline Microrods for High-Performance Photodetector" Materials Advances*, **2022**, *3*, 8771-8779. **(IF-4.7, *Citations-1*)**

27. **R. K. Ulaganathan***, C.-Y. Lin*, R. Sankar*, Raghavan Chinnambedu Murugesan, Ambika Subramanian, A. Rozhin and S. Firdoz, *"A Silicon-Based Two-Dimensional Chalcogenide of p-type Semiconducting Silicon Telluride Nanosheets for Ultrahigh Sensitive Photodetector Applications" Journal of Material Chemistry C*, **2021**, 9, 10478. **(IF-5.1, *Citations-5*)**

28. C. R. P. Inbaraj, R. J. Mathew, **R. K. Ulaganathan**, R. Sankar, M. Kataria, H. Y. Lin, Y. T. Chen, M. Hofmann, C. H. Lee, Y. F. Chen, "*A Bi-anti-ambipolar Field Effect Transistor*" *ACS Nano*, **2021**, *15*, 8686-8693. **(IF-16, *Citations-26*)**

29. P. Perumal, **R. K. Ulaganathan**, R. Sankar, L. Zhu*, *"Staggered Band Offset Induced High-Performance Optoelectronic Devices: Atomically Thin Vertically Stacked GaSe-SnS_2 van der Waals p-n Heterostructures" Applied Surface Science*, **2021**, *535*, 147480. **(IF-6.9, *Citations-15*)**

30. **R. K. Ulaganathan**, R. Sankar, C. Y. Lin, R. C. Murugesan, K. Tang, F. C. Chou* *"High-performance Flexible Broadband Photodetectors Based on 2D Hafnium Selenosulfide Nanosheets" Advanced Electronic Material*, **2020**, *6*, 1900794. **(IF-5.3, *Citations-24*)**

31. **R. K. Ulaganathan**, P. K. Roy, R. C. Murugesan, S. Mhatre, H. I. Lin, W. L. Chen, Y. F. Chen, Y. M. Chang, R. Sankar, F. C. Chou, C. T. Liang*, *"Unprecedented Random Lasing in 2D Organolead Halide Single-Crystalline Perovskite Microrods"* *Nanoscale*, **2020**, 12, 18269-18277. **(IF- 5.1, *Citations-19*)**

32. C. R. P. Inbaraj, R. J. Mathew, **R. K. Ulaganathan**, R. Sankar, M. Kataria, H. Y. Lin, H. Y. Cheng, K. H. Lin, H. I. Lin, Y. M. Liao, F. C. Chou, Y. T. Chen, C. H. Lee, Y. F. Chen*, *"Modulating Charge Separation with Hexagonal Boron Nitride Mediation in Vertical Van der Waals Heterostructures"* *ACS Applied & Material Interfaces*,**2020**, *12*, 26213-26221. **(IF-8.2, Citations-13)**

33. A. S. Kumar, K. Premasiri, M. Gao, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, X. P. A. Gao*, *"Electron-Electron Interactions in 2D Semiconductor InSe"* *Physical Review B*, **2020**, 001300. **(IF-3.7, *Citations-6*)**

34. **R. K. Ulaganathan**, K. Yadav, R. Sankar, F. C. Chou, Y. T. Chen*, *"Hybrid InSe Nanosheets and MoS_2 Quantum Dots for High-Performance Broadband Photodetectors and Photovoltaic Cells"* *Advanced Material Interfaces*, **2019**, *6*, 1801336. **(IF-4.4, *Citations-31*)**

35. C. R. P. Inbaraj, V. K. Gudelli, R. J. Mathew, **R. K. Ulaganathan**, R. Sankar, H. Y. Lin, H. I. Lin, Y. M. Liao, H. Y. Cheng, K. H. Lin, F. C. Chou, Y. T. Chen, C. H. Lee, G. Y. Guo, Y. F. Chen*, *"Sn-doping Enhanced Ultra-High Mobility $In_{1-x}Sn_xSe$ Phototransistor"* *ACS Applied & Material Interfaces*, **2019**, *11*, 24269-24278. **(IF-8.2, *Citations-18*)**

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Under Review [4]

54. S. Majumder, V. S. G. Krishna, S. K. Sahu, **R. K. Ulaganathan**, R. Sankar, C. Kumar*, "*Reconfigurable pn/np diode switching in α-In2Se3 by gate and temperature control"* *Advanced Functional Materials*, **2026**

55. D. Kumar, J. Khatua, M. Suthar, **R. K. Ulaganathan**, J. Kang, H. Cui, S.Seong, S. H. Chang, K. H. Kim, R. Sankar*, M-J Seong,*, K.-Y. Choi,*"*Tuning magnetic, lattice, and transport properties in $CoNb_3S_6$ via Fe doping"* *Physical Review B*, **2026**

56. D. G.-Mart´ınez, L. Moreschini, E. H.-Guerra, A. Cort´es-Flores, M. Puppin, O. Dogadov, P.Marsik, C. Bernhard, R. Sankar, **R. K. Ulaganathan** ,W. H. Bi, A. Magrez, A. Bostwick, C. Jozwiak, E. Rotenberg,H. Dil, F.Carbone, A. Lanzara, C. Dallera, E. Carpene, D. Santos-Cottin, M. Reyes Calvo, A. Crepaldi* "*Direct View of a Persistent Photoexcited State in Chiral Weyl Semiconductor $CdAs_2$"* *npj Quantum Materials,* **2026**

57. R. Kalaivanan, D. Kumar, D.Alltrin, H. H. Lung, M. Shankar, K. Sridharan,Y.Huang, Z. Zhang, B. Yu, A.Rana, **R. K. Ulaganathan**, I. Panneer Muthuselvam*, H.-T.Jeng1*, X. Xu,* R. Sankar* "*Cascade metamagnetic transitions and quantum criticality phase boundary scaling in antiferromagnetic TbAsSe"* *Physical Review B*, **2026**

On-Going Publications [3]

58. **R. K. Ulaganathan***, R. C. Murugesan* C. -Y. Lin, A. Subramanian, A. Rozhin and R. Sankar* "Millimeter-Sized Chiral 2D Perovskite Single Crystal Photodetector with High Performance and Efficient Stability" (In Preparation).

59. **R. K. Ulaganathan*** A. Subramanian, R. C. Murugesan* C. -Y. Lin,, A. Rozhin and R. Sankar* "$(BA)_2FAPb_2I_7$ Perovskite for Multifunctional and Efficient Optoelectronic Applications" (In Preparation).

60. G. Ghimire, **R. K. Ulaganathan**, O. Chenko, C. Piccinini, B. Munkhbat, Y. Pilhun, E. Lee, K. P. Dhakal, J. Kim, D. I. Miakota, S. Canulescu, R. R. Unocic, J. Heske, D. I. Miakota, C. Xiang, M. Chaigneau, K. S. Thygesen, T. Booth, D. B. Geohegan, S. Canulescu, "Raman, Differential & Reflectance Anisotropy and Polarization Sensitive Photodetection from 1D MoS_2 Nanorods" (In Preparation).

Conferences & Symposium Meetings (28)

1. D. Kumar, J. Khatua, N. T. Hoang, Y. Sim, **R. K. Ulaganathan**, K. Raju, R. Sankar, M.-J. Seong, K.-Y. Choi*, "Anion-substituted suppression of Zhang-Rice exciton in $NiPS_3$ antiferromagnet" Low-Energy Electrodynamics in Solids (LEES-2025), Haeundae, South Korea. "

2. **R. K. Ulaganathan***, P. K. Roy, C.-T. Liang, R. Sankar*, *"High-Performance Photodetector and Angular-Dependent Random Lasing from Long- Chain Organic Diammonium Sandwiched 2D Hybrid Perovskite Non-linear Optical Single Crystal"* International Workshop on Transport and Optics in Topological Systems (TOTS-2024), Taipei, Taiwan.

3. D. I. Miakota, G. Ghimire, F. L. Larsen, R. Malureanu, **R. K. Ulaganathan**, S. Canulescu *"Alkali-assisted Synthesis of Multilayer Crystalline MoS_2 Nanoribbons with 2D Edges, and Schottky Barrier Observation on MoS_2 Nanoribbon-Au/Cr Junction"* 2D Transition Metal Dichalcogenides-2024, Hongkong.

4. A. Subramanian, V. Thirunavukkarasu, **R. K. Ulaganathan***, R. Sankar, W. S. Lew, C.-Y. Lin, *"Photoconduction Properties in Germanium Sulfide Nanosheets on Rigid and Flexible Substrates"* 8th IEEE Electron Devices Technology & Manufacturing Conference-2024, Bangalore, India.

5. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota,S. Canulescu, *"MoS_2 Nanostructures with Tailored Dimensionality"* Materials Research Society (MRS) Spring Meeting & Exhibit-2023, San Francisco, United States.

6. **R. K. Ulaganathan**, G. Ghimire, D. I. Miakota,S. Canulescu, *"$pMoO_x$-$nMoS_2$ Heterojunction Assembly for Tunable and Efficient Optoelectronic Devices"* 4th European Congress on Graphene & 2D Materials-2022, Paris, France.

7. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota,S. Canulescu, *"Quasi One-Dimensional MoS_2 Nanoribbons"* 12th European Conference and Exhibition in Graphene and 2D Materials-2022, Aachen, Germany.

8. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota, S. Engberg, S. Canulescu, *"Light Harvesting in MoS2 Semiconducting Homostructures"* 12th Hybrid European Kesterite Worshop-2022, Lyngby, Denmark.

9. D. I. Miakota, G. Ghimire, F. F. Bertoldo, **R. K. Ulaganathan**, R. U. Raymond, B. G. David, S. L. J. Engberg, F. B. Fabian, K. S. Thygesen, S. Canulescu, *"Laser-assisted Synthesis of 2D Quantum Materials and Heterostructures"* 16th International Conference on Laser Ablation, Matsue, Japan.

10. T. P. Lu, M. X. Loi, J. J. Yeh, A. Subramanian, P. H. Chiu, C. H. Wu, H. W. Liu, **R. K. Ulaganathan**, C. Y. Lin, *"Electrical Characteristics of InSe-based Field-effect Transistors"* International Conference on Applied System Innovation (IEEE)-2022, Nantou, Taiwan.

11. D. I. Miakota, G. Ghimire, **R. K. Ulaganathan**, R. U. Raymond, B. G. David, S. L. J. Engberg, S. Canulescu, *"A Potential Approach to Grow Vander Waals Heterostructures based on Pulsed Laser Deposition of Solid Oxide Precursors for Thin Film Photovoltaics"* European Materials Research Society (EMRS)-2022, France.

12. D. I. Miakota, G. Ghimire, **R. K. Ulaganathan**, R. U. Raymond, B. G. David, S. L. J. Engberg, F. B. Fabian, K. S. Thygesen, S. Canulescu, *"Two-Dimensional Tungsten Disulfide Monolayers Synthesized from Solid Oxide Precursor Grown by Pulsed Laser Deposition"* Materials Research Society (MRS) Fall Meeting-2021, Boston, United States.

13. **R. K. Ulaganathan**, R. Sankar, F. C. Chou*, *"High-Performance Flexible Broadband Photodetectors Based on 2D Hafnium Selenosulfide Nanosheets"* CCMS Annual Meeting 2020, Taipei, Taiwan – "Honorable Mention Award"

14. A. Kumar, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, X. Gao*, *"Effect of Oxygen Adsorption on Electron Transport in Few-Layer InSe FETs"* American Physical Society (APS) Annual Meeting-2019, March 4-8th, Boston, United States.

15. **R. K. Ulaganathan**, T. P. Chen, C. M. Raghavan, R. Sankar, C. W. Chen, F. C. Chou*, *"Stable Two-dimensional Ruddlesden-Popper Hybrid Lead Iodide Perovskites for Optoelectronic Applications"* Annual Meeting of Centre of Atomic Initiatives for New Materials-2018, November 16th, Taipei, Taiwan.

16. K. Viraj, S. Sucharitakul, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, X. Gao*, *"Tuning Spin-orbit coupling in Few-layer InSe"* American Physical Society (APS) Annual Meeting 2018, March 5-9th, Los Angeles, United States.

17. Chang-Yu Lin*, **R. K. Ulaganathan**, Raman Sankar, and Fang-Cheng Chou, *"The Metal-Contacts on Graphene-like Layered Materials"* IEEE ICASI-2017, May 13-17th, Sapporo, Japan.

18. **R. K. Ulaganathan**, Y. T. Chen*, *"Novel two-dimensional materials for the Transistor, Photodetector, and Light-emitting Device Applications"* Annual Graduate Symposium, Department of Chemistry-2016, June 11th, Taipei, Taiwan – "Awarded Best Thesis Poster"

19. S. Sucharitakul, M. Liu, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, Y. T. Chen, X. Gao*, *"Few-Layer III-VI and IV-VI 2D Semiconductor Transistors"* American Physical Society (APS) March Meeting-2016, March 14-18th, Baltimore, United States.

20. **R. K. Ulaganathan**, Y. T. Chen*, *"High Photosensitivity and Broad Spectral Response of Multi-layered Germanium Sulfide Transistors"* Materials Research Society (MRS) Meeting and Exhibit-2016, March 28th-April 1st Phoenix, United States.

21. **R. K. Ulaganathan**, Y. T. Chen*, *"Optoelectronics and Energy-Related Applications of Two-Dimensional Materials"* International Nanotechnology Conference and Expo-2016, April 4-6th, Baltimore, United States.

22. **R. K. Ulaganathan**, Y. T. Chen*, *"New Two-Dimensional Semiconductor and Their Potential Opto-Electronic Applications"* SF Nano Annual Meeting-2016, December 12-14th, Paris, France.

23. **R. K. Ulaganathan**, Y. Y. Lu, C. J. Kuo, S. R. Tamalampudi, R. Sankar, F. C. Chou, Y. T. Chen*, *"High Photosensitivity and Broad Spectral Response of Multi-layered Germanium Sulfide Transistors"* 11th International Conference and Expo on Nanoscience & Molecular Nanotechnology-2016, October-20-22nd, Rome, Italy.

24. **R. K. Ulaganathan**, Y.T. Chen*, *"A Highly Photoresponsive Multi-Layered Germanium Sulfide Photodetector"* Annual meeting of Nanoscience and Nanotechnology Program-2016, May, Taipei, Taiwan – "One of Top 10 Best Poster"

25. S. Sucharitakul, N. Goble, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, Y. T. Chen, X. Gao*, *"Field-effect vs. Hall Mobility in Back-gated Multi-layered InSe FETs"* American Physical Society (APS) March Meeting-2015, March 2-6th, San Antonio, United States.

26. **R. K. Ulaganathan**, Y. T. Chen*, *"A Novel Two-dimensional Misfit Layered Material for Nanoelectronics Devices"* Annual meeting of Nanoscience and Nanotechnology Program 2015, May, Taipei, Taiwan – "One of Top 10 Best Poster"

27. **R. K. Ulaganathan**, K. R. J. Thomas*, *"Hybrid Nanostructures for the Efficiency of Dye-Sensitized Solar Cells"* International Conference on Advancement of Nanoscience and Nanotechnology (ICOANN)-2010, Karaikudi, India.

28. R. Agarwal, **R. K. Ulaganathan**, A. Baheti, K. R. J. Thomas*. *"Interaction of TiO_2 Nanoparticles in Organic Dye for Dye-Sensitized Solar Cell"* Modern Trends Inorganic Chemistry (MTIC-X111)-2009, IISC, Bangalore, India.