

# 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<sub>2</sub>)**, **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<sub>2</sub> 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: 9.1 Years/Teaching: 1 Years)

### Current Position

#### **Assistant Professor Grade-I, (1 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: Courses-Nanoscale Fabrication Techniques/ M.Tech. 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 (DTU)

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 (NTU)

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

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

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

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

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

Sep.2004-May2008

Awarded: Distinction with First Class

## Honors & Awards

2025 Editorial Board Members, Scientific Reports

Nature Portfolio, UK

2024 Plum Blossom Card, Senior Professional Researcher (Permanent Resident Status)

NIA, Taiwan

2024 Junior Research Investigators, Research Paper Award (Public Talk, Medal, and Grant NT\$-100000)

IoP, Taiwan

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|-----------------------------------------------------------------------------------------------|--------------|
| <b>2022 Inspire Faculty Award</b> , Independent Research Starting Grant                       | DST, India   |
| <b>2021 Global Talent Award</b> , Skilled Researcher (Taiwan Golden VISA Entry)               | TGC, Taiwan  |
| <b>2020 Honorable Mention Award</b> , Best Poster Presentation (Certificate)                  | NTU, Taiwan  |
| <b>2019 Young Researcher Award</b> , Researcher Award (Certificate, Medal, & Grant NT\$-5000) | TTS, Taiwan  |
| <b>2017 Visiting Grant</b> , Researcher Travel Grant (Grant NT\$-80000)                       | MOST, Taiwan |
| <b>2016 Popular Poster Award</b> , Ph.D. Best Thesis Poster Presentation (Certificate)        | NTU, Taiwan  |
| <b>2016 Travel Grant</b> , Student International Travel Grant (Grant NT\$-60000)              | AS, Taiwan   |
| <b>2008 Distinction Award</b> , Excellence in Undergraduate Program (Certificate)             | AU, India    |
| <b>2004 Gold Medal</b> , Secure High Marks in Higher Secondary Examination (Gold Coin)        | India        |

## Fellowships

|                                                                                          |              |
|------------------------------------------------------------------------------------------|--------------|
| <b>2021 Postdoctoral Fellowship</b> , Independent Research Fund, Sapere Aude.            | IRF, Denmark |
| <b>2016 Postdoctoral Fellowship</b> , National Science & Technology Council.             | NSTC, Taiwan |
| <b>2010 Taiwan Scholarship</b> , To Pursue a Doctorate.                                  | MoE, Taiwan  |
| <b>2010 TIGP Fellowship</b> , To Pursue a Doctorate.                                     | AS, Taiwan   |
| <b>2008 MHRD Fellowship</b> , To Pursue a Postgraduate.                                  | MHRD, India  |
| <b>2005 Tamil Nadu Chief Minister Award</b> , 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, MoE- Ministry of Education, AU-Anna University, and GoTN- Government of Tamil Nadu]

## Projects

- Title:** *Cost-effective, Scalable, and Reproducible 2D Hybrid Perovskites for High-Efficient Transistor and Photodetector Technologies*  
**Cost:** 67.57 Lakhs  
**Role:** PI  
**Funding Agency:** [ANRF-PMECR](#)  
**Year:** 2025-2028
- Title:** *2D Hybrid Perovskite Crystals: A Scalable Solution for High Performance Transistor and Photodetector Devices*  
**Cost:** Experimental facilities at UGC-DAE CSR [Kalpakkam] and Travel Expenses  
**Role:** PI  
**Funding Agency:** [UGC-DAE](#)  
**Year:** 2025-2026
- Title:** *2D Indium selenide Nanosheets and their Potential Opto-Electronic Applications*  
**Cost:** 20 Lakhs  
**Role:** PI  
**Funding Agency:** [FIG, SRIC-IITR](#)  
**Year:** 2025-2027

## Invited Talks, Seminars & Lectures

|                                                                                                                                               |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>2025 "Challenges, Sustainability and AI/ML Technologies in Polymer and Petrochemical Sectors (CSATPP) @ IIT Roorkee, Saharanpur Campus</b> | India |
| <b>2025 " 3rd International Conference on Energy, Functional Materials/Molecules and Nanotechnology (ICEFN) @ Kumaun University, Nainital</b> | India |
| <b>2025 "Nanomaterials in Optoelectronic Devices", IIT-ISM Dhanbad [Malaviya Mission Teacher Programme]</b>                                   | India |
| <b>2024 "2D Materials in Optoelectronic Devices", IIT-ISM Dhanbad [Faculty Development Program]</b>                                           | India |

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|----------------------------------------------------------------------------------------------------------|-------------|
| 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      |

## Professional Activities

|                                                 |                           |
|-------------------------------------------------|---------------------------|
| 2025 Editorial Board Member- Scientific Reports | Nature Portfolio          |
| 2024 Associate Editor- RW Materials             | Research Wheel Publishers |
| 2024 Member Secretary-Centre Faculty Committee  | IIT Roorkee               |
| 2024 Representative-Student Wellness Centre     | IIT Roorkee               |
| 2025 Ranking Officer-Centre for Nanotechnology  | IIT Roorkee               |

## 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 Ghimrie - 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      |
| 4 <sup>th</sup> European Congress on Graphene & 2D Materials, Paris               | France      |
| Korea Tech- Department of Mechatronics                                            | South Korea |
| Anna University - Crystal Growth Centre                                           | India       |

## 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 [50]

**Published Articles: 47 [Citations-2800+, h-index 22 and i10-index 32]**

 <https://www.urajeshiitr.com>  
 <https://scholar.google.com.tw/citations?user=G0n3Pq8AAAAJ&hl=en>

[Advanced Materials (1), Advanced Functional Materials (4), ACS Nano (1), Nano Letters (4), Chemical Engineering Journal (1), ACS Applied & Material Interfaces (5), 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), Analyst (1), Catalysts (1), Journal of Physics: Condensed Matter (1), Biomicrofluidics (1), & AIP Advances (1)]

**\* Corresponding Author (3) & <sup>±</sup> Review Articles (3)**

1. 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)
2. 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)
3. 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<sub>3-x</sub>Se<sub>x</sub> by anion substitution" *npj 2D Materials & Applications*, **2025**, (IF-8.8)
4. S. Choudhury, S. Kalal, **R. K. Ulaganathan**, R. Sankar, S. K. Manatha, "Interplay of Td and 1T' Phases Influencing the Transport Properties of MoxW<sub>1-x</sub>Te<sub>2</sub> Weyl Semimetals" *The Journal of Physical Chemistry C*, **2025**, 129, 11407–11416. (IF-3.2)
5. 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**, (IF-8.8)
6. G. S. Murugan, J. Khatua, S. Kim, E. Mun, 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<sub>2</sub>Cu<sub>3</sub>(MoO<sub>4</sub>)<sub>4</sub>" *Physical Review B*, **2025**, 111, 144420. (IF-3.7)
7. 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<sub>2</sub>S<sub>6</sub>" *Physical Review B*, **2025**, 111, 134415. (IF-3.7)
8. 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)
9. 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<sub>3</sub>" *Advanced Functional Materials*, **2024**, 2405153. (IF-19)
10. 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<sub>3-x</sub>S<sub>x</sub>" *Physical Review B*, **2024**, (IF-3.7)
11. 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)
12. 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<sub>2</sub> Basal Planes Enhanced by Surface Electron Accumulation" *Catalysts*, **2024**, 2302469. (IF-4)
13. 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<sub>2</sub> Nanoribbons with Enhanced Edge Nonlinear Response and Photoresponsivity" *Advanced Materials*, **2023**, 2302469. (IF-26.8)
14. **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)
15. 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<sub>2</sub> Nanostructures" *Nanoscale*, **2023**, 15, 19735. (IF-5.1)
16. 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)

17. D. I. Miakota, G. Ghimire, **R. K. Ulaganathan**, M E. Rodriguez, S. Canulescu, "A novel Two-step Route to Unidirectional Growth of Multilayer MoS<sub>2</sub> Nanoribbons" *Applied Surface Sciences*, 2023, 619, 156748. (IF-6.9, Citations-5)
18. **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)
19. 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)
20. **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)
21. 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)
22. P. Perumal, **R. K. Ulaganathan**, R. Sankar, L. Zhu\*, "Staggered Band Offset Induced High-Performance Optoelectronic Devices: Atomically Thin Vertically Stacked GaSe-SnS<sub>2</sub> van der Waals p-n Heterostructures" *Applied Surface Science*, 2021, 535, 147480. (IF-6.9, Citations-15)
23. **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)
24. **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)
25. 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)
26. 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)
27. **R. K. Ulaganathan**, K. Yadav, R. Sankar, F. C. Chou, Y. T. Chen\*, "Hybrid InSe Nanosheets and MoS<sub>2</sub> Quantum Dots for High-Performance Broadband Photodetectors and Photovoltaic Cells" *Advanced Material Interfaces*, 2019, 6, 1801336. (IF-4.4, Citations-31)
28. 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<sub>1-x</sub>Sn<sub>x</sub>Se Phototransistor" *ACS Applied & Material Interfaces*, 2019, 11, 24269-24278. (IF-8.2, Citations-18)
29. **R. K. Ulaganathan**, Y. H. Chang, D. Y. Wang, S. S. Li\*, "Light and Matter Interaction in Two-Dimensional Atomically Thin Films" *Bulletin of the Chemical Society of Japan*, 2018, 91, 761-771. (IF-3.8, Citations-22) - "Journal Cover Page"
30. K. Premasiri, S. K. Radha, S. Sucharitakul, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, Y. T. Chen, X. P. A. Gao\*, "Tuning Rashba Spin-Orbit Coupling in Gated Multilayer InSe" *Nano Letters*, 2018, 7, 4403-4408. (IF-9.1, Citations-65)
31. Y. Li, T. M. Wang, H. Wang, Z. P. Li, Y. W. Chen, D. West, R. Sankar, **R. K. Ulaganathan**, F. C. Chou, C. Wetzel, C. Y. Xu, S. B. Zhang, S. F. Shi\*, "Enhanced Light Emission from the Ridge of Two-dimensional InSe Flakes" *Nano Letters*, 2018, 18, 5078-5084. (IF-9.1, Citations-36)
32. C. R. P. Inbaraj, R. J. Mathew, G. Haider, T. P. Chen, **R. K. Ulaganathan**, R. Sankar, K. P. Bera, Y. M. Liao, M. Kataria, H. I. Lin, Y. T. Chen, C. H. Lee, Y. F. Chen\*, "Ultra-high Performance Flexible Piezo Potential Gated In<sub>1-x</sub>Sn<sub>x</sub>Se Phototransistor" *Nanoscale*, 2018, 10, 18642-18650. (IF-5.1, Citations-15)

33. Y. Li, T. Wang, M. Wu, T. Cao, Y. W. Chen, R. Sankar, **R. K. Ulaganathan**, F. C. Chou, C. Wetzel, C. G. Xu, S. G. Louie, S. F. Shi\*, "Ultrasensitive Tunability of the Direct Bandgap of 2D InSe Flakes via Strain Engineering" *2D Materials*, **2018**, 5, 021002. (IF-4.3, Citations-86)
34. C. J. Kuo, H. C. Chiang, C. A. Tseng, C. F. Chang, **R. K. Ulaganathan**, T. T. Ling, Y. J. Chang, C. C. Chen, Y. R. Chen, Y. T. Chen\*, "Lipid- Modified Graphene-Transistor Biosensor for Monitoring Amyloid- $\beta$  Aggregation" *ACS Applied & Material Interfaces*, **2018**, 10, 12311-12316. (IF -8.2, Citations-22)
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42. S. Sucharitakul, N. J. Goble, **R. K. Ulaganathan**, R. Sankar, Z. A. Bogorad, F. C. Chou, Y. T. Chen, X. P. A. Gao\*, "Intrinsic Electron Mobility Exceeding  $10^3 \text{ cm}^2/(\text{V s})$  in Multilayer InSe FETs" *Nano Letters*, **2015**, 15, 3815-3819. (IF-9.1, Citations-392) - "Highly cited paper placed top 1% in the field of Physics-Citations above 400"
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45. K. K. Sriram, C. L. Chang, **R. K. Ulaganathan**, C. F. Chou\*, "DNA Combing on Low-pressure Oxygen Plasma Modified polysilsesquioxane Substrates for Single-molecule Studies" *Biomicrofluidics*, **2014**, 8, 052102. (IF-2.4, Citations-12)
46. <sup>†</sup>B. R. Li, C. C. Chen, **R. K. Ulaganathan**, Y. T. Chen\*, "Advances in Nanowire Transistors for Biological Analysis and Cellular Investigation" *Analyst*, **2014**, 139, 1589-1608. (IF-3.3, Citations-63)

#### Under Review [7]

47. J. Yan, H. Takeda, **R. K. Ulaganathan**, K. Raju, R. Sankar, M. Yamashita, "Field-Angle Dependence of Phonon Thermal Hall Effect" (Under Review: Nature Physics).
48. T.-H. Wu, C.-E. Hsu, **R. K. Ulaganathan**, R. Sankar, Z. Li, C.-C. Lee, C.-S. Chang, K.-H. Lin\*, "Anisotropic Screening of

excitons in van der Waals Materials" (Under Review: npj 2D Materials & Applications).

49. R. Moqbel, R. K. Vankayala, R. K. Ulaganathan, R. Sankar, M.-N. Ou, C.-C. Lee\*, K.-H. Lin\* "Ferroelastic switching in  $\alpha$ -phase few-layer Group-IV monochalcogenides by mechanical forces" (Under Review: Advanced Materials)
50. H. K. Bangolla, C.-Y. Chen, C.-M. Cheng, K.-Y. Lee, L.-C. Chao, **R. K. Ulaganathan**, R. Sankar, R.-S. Chen\* "Spatially Separated Bipolar Transport and Surface Electron Accumulation in Tungsten Diselenide Nanostructures" (Under Review: Applied Surface Science).
51. N.-X. Li, C. R. P. Inbaraj, R. Sankar, Hsia Yu Lin, **R. K. Ulaganathan**, R. J. Mathew, Y.-T. Chen, Y.-F. Chen\*, "Negative Differential Resistance in Trichalcogenide Based Broken-Gap n-n Heterostructures" (Submitted: ACS Applied Energy Materials).

### On-Going Publications [3]

52. **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).
53. **R. K. Ulaganathan\*** A. Subramanian, R. C. Murugesan\* C. -Y. Lin,, A. Rozhin and R. Sankar\* "(BA)<sub>2</sub>FAPb<sub>2</sub>I<sub>7</sub> Perovskite for Multifunctional and Efficient Optoelectronic Applications" (In Preparation).
54. 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<sub>2</sub> Nanorods" (In Preparation).

### Conferences & Symposium Meetings (27)

1. **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.
2. D. I. Miakota, G. Ghimire, F. L. Larsen, R. Malureanu, **R. K. Ulaganathan**, S. Canulescu "*Alkali-assisted Synthesis of Multilayer Crystalline MoS<sub>2</sub> Nanoribbons with 2D Edges, and Schottky Barrier Observation on MoS<sub>2</sub> Nanoribbon-Au/Cr Junction*" 2D Transition Metal Dichalcogenides-2024, Hongkong.
3. 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.
4. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota, S. Canulescu, "*MoS<sub>2</sub> Nanostructures with Tailored Dimensionality*" Materials Research Society (MRS) Spring Meeting & Exhibit-2023, San Francisco, United States.
5. **R. K. Ulaganathan**, G. Ghimire, D. I. Miakota, S. Canulescu, "*pMoO<sub>x</sub>-nMoS<sub>2</sub> Heterojunction Assembly for Tunable and Efficient Optoelectronic Devices*" 4th European Congress on Graphene & 2D Materials-2022, Paris, France.
6. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota, S. Canulescu, "*Quasi One-Dimensional MoS<sub>2</sub> Nanoribbons*" 12th European Conference and Exhibition in Graphene and 2D Materials-2022, Aachen, Germany.
7. G. Ghimire, **R. K. Ulaganathan**, D. I. Miakota, S. Engberg, S. Canulescu, "*Light Harvesting in MoS<sub>2</sub> Semiconducting Homostructures*" 12<sup>th</sup> Hybrid European Kesterite Workshop-2022, Lyngby, Denmark.
8. 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.
9. 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.

10. 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.
11. 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.
12. **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"**
13. 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.
14. **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.
15. 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.
16. 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.
17. **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"**
18. 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.
19. **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.
20. **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.
21. **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.
22. **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.
23. **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 - **"Selected as a Top 10 Best Poster"**
24. 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.
25. **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 - **"Selected as a Top 10 Best Poster"**
26. **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.
27. R. Agarwal, **R. K. Ulaganathan**, A. Baheti, K. R. J. Thomas\*. *"Interaction of TiO<sub>2</sub> Nanoparticles in Organic Dye for Dye-Sensitized Solar Cell"* Modern Trends Inorganic Chemistry (MTIC-X111)-2009, IISC, Bangalore, India.