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 (8.5 Years)

Current Position

Assistant Professor Grade-I, (4 M) — **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:

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

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
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
2005 **Tamil Nadu Chief Minister Award**, Excellence in Higher Secondary Examination (Fellowship) — GoTN, India
2004 **Gold Medal**, Secure High Marks in Higher Secondary Examination (Gold Coin) — India

Fellowships

2021 **Postdoctoral Fellowship**, Independent Research Fund, Sapere Aude. — IRF, Denmark
2016 **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

[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]

Invited Talks, Seminars & Lectures

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

Project Supervised

Co-Supervised Master & Bachelor Students @DTU:

2023 Bachelor Thesis: *"Controllable Doping in Two-Dimensional Materials"* - Peter Frederik Jensen.
2023 Master Thesis: *"Fermi-Level Depinning of Wafer-Scale MoS_2 Using Functionalized CVD Graphene"*- Angelos.
2023 Master Thesis: *"Sb_2S_3 Thin-Film Solar Cells"* - Alexandra Tsekou.
2023 Special Course: *"Ultrathin and Ultra-Light Solar Cells based on van der Waals Materials"*- Rasmus & Malthe.

Professional Activities

2024 **Associate Editor**, RW Materials — Research Wheel Publishers
2024 **Member Secretary**, Centre Faculty Committee — 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 Ghimirie** - Technical University of Denmark — Denmark

Assistant Professor **Chang-Yu LIN** - Chung Yuan Christian University — Taiwan

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
Anna University - Crystal Growth Centre	India

Journal Peer-Reviewer

ACS Applied Material & Interfaces (IF- 9.5)	ACS Publisher
Ultrasonics-Sonochemistry (IF- 8.4)	Elsevier Publisher
Chemosphere (IF- 8.8)	Elsevier Publisher
Nanoscale (IF- 6.7)	RSC Publisher
Ceramic Internationals (IF- 5.2)	Elsevier Publisher
Analytical & Bioanalytical Chemistry (IF- 4.3)	Springer Publisher
Journal of Nanomaterials (IF- 3.791)	Hindawi Publisher
Materials Today Communications (IF- 3.8)	Elsevier Publisher
Advanced Photonics Research (IF- 3.7)	Wiley Publisher
Optik (IF- 3.1)	Elsevier Publisher
Applied Physics A (IF- 2.7)	Springer Publisher

Research Publications [45]

Published Articles: 38 [Citations-2575+, h-index 22 and i10-index 30]

https://urajeshiitr.wixsite.com/rajesh-kumar

https://scholar.google.com.tw/citations?user=G0n3Pg8AAAAJ&hl=en

[Advanced Materials (1), Advanced Functional Materials (4), ACS Nano (1), Nano Letters (4), ACS Applied & Material Interfaces (5), 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 (3), Analyst (1), Catalysts (1), Biomicrofluidics (1), & AIP Advances (1)]

*** Corresponding Author (3) & ⊥ Review Articles (2)**

1. 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-18.5)**

2. 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-3.2)**

3. 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-3.2)**

4. 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-3.8)**

5. 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-27.4)**

6. **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-18.5, *Citations-2*)**

7. 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-5.8)**

8. 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-4.4)**

9. 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-6.3, Citations-5)**

10. **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-18.5, *Citations-11*)**

11. 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-5.2, *Citations-1*)**

12. **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-5.7, *Citations-5*)**

13. 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-15.8, *Citations-26*)**

14. 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-6.3, *Citations-15*)**

15. **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*)**

16. **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- 5.8, *Citations-19*)**

17. 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-8.3,Citations-13)**

18. 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-3.2, *Citations-6*)**

19. **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-4.3, *Citations-31*)**

20. 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-8.3, *Citations-18*)**

21. **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-3.3, *Citations-22*)** -*"Journal Cover Page"*

22. 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-9.6, *Citations-65*)**

23. 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-9.6, *Citations-36*)**

24. 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 $In_{1-x}Sn_xSe$ Phototransistor" Nanoscale*, **2018**, *10*, 18642-18650. **(IF-5.8, *Citations-15*)**

25. 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-4.5, *Citations-86*)**

26. 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-β Aggregation" ACS Applied & Material Interfaces*, **2018**, *10*, 12311-12316. **(IF -8.3, *Citations-22*)**

27. C. A. Tseng, C. C. Chen, **R. K. Ulaganathan**, C. P. Lee, H. C. Chiang, C. F. Chang, Y. T. Chen*, *"One-Step Synthesis of Antioxidative Graphene-Wrapped Copper Nanoparticles on Flexible Substrates for Electronic and Electrocatalytic Applications" ACS Applied & Material Interfaces*, **2017**, *9*, 25067-25072. **(IF-8.3, *Citations-23*)**

28. C. Y. Lin*, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, *"Ambipolar Behaviors of Few-layered InSe Field-Effect Transistors" AIP Advances*, **2017**, *7*, 075314. **(IF-1.4, *Citations-12*)**

29. K. Yadav, A. C. Chou, **R. K. Ulaganathan**, H. D. Gao, H. M. Lee, C. Y. Pan, Y. T. Chen*, *"Targeted and Efficient activation of Channelrhodopsins Expressed in Living Cells via Specifically-bound Upconversion Nanoparticles" Nanoscale*, **2017**, *9*, 9457-9466. **(IF-5.8, *Citations-29*)**

30. A. Anand, C. R. Liu, A. C. Chou, W. H. Hsu, **R. K. Ulaganathan**, Y. C. Lin, C. A. Dai, F. G. Tseng, C. Y. Pan, Y. T. Chen*, *"Detection of K^+ Efflux from Stimulated Cortical Neurons by an Aptamer-Modified Silicon Nanowire Field-Effect Transistor" ACS Sensors*, **2017**, *2*, 69-79. **(IF - 8.2, *Citations-43*)**

31. **R. K. Ulaganathan**, Y. Y. Lu, C. J. Kuo, S. R. Tamalampudi, R. Sankar, K. M. Boopathi, A. Anand, K. Yadav, R. J. Mathew, C. R. Liu, F. C. Chou, Y. T. Chen*, *"High Photosensitivity and Broad Spectral Response of Multi-layered Germanium Sulfide Transistors" Nanoscale*, **2016**, *8*, 2284-2292. **(IF-5.8, *Citations-150*)** - *"Citations above 150"*

32. P. Perumal, **R. K. Ulaganathan**, R. Sankar, Y. M. Liao, T. M. Sun, M. W. Chu, F. C. Chou, Y. T. Chen, M. H. Shih, Y. F. Chen*, *"Ultra-thin Layered Ternary Single Crystals $[Sn(S_xSe_{1-x})_2]$ with Bandgap Engineering for High-performance Phototransistors on Versatile Substrates" Advanced Functional Material*, **2016**, *26*, 3630-3638. **(IF-18.5, *Citations-82*)**

33. S. Sucharitakul, **R. K. Ulaganathan**, R. Sankar, F. C. Chou, Y. T. Chen, C. Wang, C. He, R. Hef, X. P. A. Gao*, *"Screening Limited Switching Performance of Multilayer 2D semiconductor FETs: the case for SnS" Nanoscale*, **2016**, *8*, 19050-19057. **(IF-5.8, Citations-65)**

34. 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 $Cm^2/(V\,s)$ in Multilayer InSe FETs" Nano Letters*, **2015**, *15*, 3815-3819. **(IF-9.6, *Citations-392*)** -*"Highly cited paper placed top 1% in the field of Physics-Citations above 400"*

35. R. D. Nikam, A. Y. Lu, P. A. Sonawane, **R. K. Ulaganathan**, K. Yadav, L. J. Li, Y. T. Chen*, "*Three-Dimensional Heterostructures of MoS_2 Nanosheets on Conducting MoO_2 as an Efficient Electrocatalyst to Enhance Hydrogen Evolution Reaction*" *ACS Applied & Material Interfaces*, **2015**, *7*, 23328-23335. **(IF-8.3, *Citations-154*)** -*"Citations above 150"*

36. S. R. Tamalampudi, Y. Y. Lu, **R. K. Ulaganathan**, R. Sankar, C. D. Liao, K. M. Boopathi, C. H. Cheng, F. C. Chou, Y. T. Chen*, *"High Performance and Bendable Few-Layered InSe Photodetectors with Broad Spectral Response"* *Nano Letters*, **2014**, *14*, 2800-2806. **(IF-9.6, *Citations-748*)** -*"Citations above 750."*

37. 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-2.6, *Citations-12*)**

38. ┘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-3.6, *Citations-63)***

Under Review [7]:

39. P. V. Pham, A. Kumar, T.-H. Mai, **R. K. Ulaganathan**, R. I. Stanchev, R. K. Gupta, R. Sankar. *"Infrared Photodetectors: Breakdown the Limit in Detection"* (Under Review: Nature Photonics).

40. 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).

41. 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: Advance Science).

42. E. Deagueros, M. Gao, A. Cai, **R. K. Ulaganathan**, M. Shankar, R. Sankar, X. p. A. Gao, *"Modulation Doping and Reduced Hysteresis in Monochalcogenide InSe/GaS Heterostructure 2D Field Effect Transistors"* (Under Review: ACS Applied Materials & Interface).

43. 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"* (Under Review: Journal of Physics: Condensed Matter).

44. 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).

45. 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]:

46. **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).

47. **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).

48. 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 (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_2 Nanoribbons with 2D Edges, and Schottky Barrier Observation on MoS_2 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_2 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, *"$pMoO_x$-$nMoS_2$ 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_2 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 MoS2 Semiconducting Homostructures"* 12th Hybrid European Kesterite Worshop-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_2 Nanoparticles in Organic Dye for Dye-Sensitized Solar Cell"* Modern Trends Inorganic Chemistry (MTIC-X111)-2009, IISC, Bangalore, India.

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