P. A. Praveen

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Positions

- **Postdoctoral Fellow** *May. 2023 – Present*
  Tohoku University, Sendai, Japan.
  - Developing furan substituted thiophene co-oligomers for organic lasing
  - Using DFT analysis, crystal growth, optical pumping and electrical characterizations
- **Research Associate** *Jan. 2023 – May. 2023*
  Indian Institute of Science Education and Research, Tirupati, India.
  - Theoretical analysis of role of furan substitution in pyrene/thiophene systems
  - Efficacy of different DFT functionals on predicting optoelectronic properties
- **Postdoctoral Fellow** *Jun. 2022 – Jan. 2023*
  University of Tartu, Estonia.
  - Design and develop diffractive optical elements for computational imaging
  - Performed theoretical and experimental analysis on incoherent holographic systems
- **Postdoctoral Fellow** *Jun. 2019 – May. 2022*
  Indian Institute of Science Education and Research, Tirupati, India.
  - Design, synthesis and crystal growth of organic semiconductors
  - Fabrication of OLETs, low power X-ray sensors and boradband photodetectors

Education

- **Doctoral Degree** *Jan. 2013 – Jun. 2019*
  Bharathidasan University, Tiruchirappalli
  Quantum chemical and experimental analysis of metal organic nanostructures for NLO applications
- **Project Student** *Jun. 2011 – Jan. 2013*
  Bharathidasan University, Tiruchirappalli
  Improvising organic medium by metal dopants for nonlinear optical applications
- **Post Graduation** *Jul. 2009 – Apr. 2011*
  Bharathidasan University, Tiruchirappalli
  First Class (CGPA 7.5)
- **Under Graduation** *Jun. 2006 – Apr. 2009*
  Periyar University, Salem
  First Class (80%)

Areas of Expertise

- **Optoelectronic devices**
  - Crystal growth and thin film deposition of organic & hybrid perovskite semiconductors
  - OFET and organic diodes fabrication and electrical characterization
  - Optical pumping, photoluminescence and spectral characteristics of organic semiconductors
- **Metal-organic NLO systems**
  - Crystal growth / thin film deposition of metal-organic systems

- Nonlinear optical studies - SHG and Z-Scan studies

- **Computational materials science**
  - Materials analysis using DFT and semiemiprical calcualtions
  - Excited state dynamics of organic optoelectronic systems
- **Incoherent imaging and holography**
  - Design and construction of incoherent imaging systems
  - Image reconstuction using computational algorithms

Instruments and Packages

- **Instruments**
  - *Crystal growth:* PVT, hydrothermal, low & high temperature solution growth
  - *Thin films:* Thermal evaporation, CVD, spin coating
  - *Structural:* PXRD, Raman, FTIR, SEM/TEM, AFM
  - *Electrical:* Parametric, Dielectric, Hall analyses
  - *Optical:* Optical gain, Indirect imaging, Z-Scan, SHG measurements
  - *Microfabrication:* Laser lablation, photolithography and thermal nano-imprinting
- **Softwares**
  Gaussian, ORCA, MOPAC, Dalton, AutoDock
- **Programming**
  Python, MATLAB, R, FORTRAN

Publications

Journal Articles

(19) **P. A. Praveen**, D. Saravanapriya, S. V. Bhat, K. Arulkannan and T. Kanagasekaran, "Comprehensive analysis of DFT-3C methods with B3LYP and experimental data to model optoelectronic properties of tetracene", *Materials Science in Semiconductor Processing*, 2024, **173**, 108159.

(18) A. Bhattacharya, **P. A. Praveen**, S. V. Bhat, S. Dhanapal, A. Kandhasamy and T. Kanagasekaran, "Theoretical insights on pyrene end-capped thiophenes/furans and their suitability towards optoelectronic applications", *Computational and Theoretical Chemistry*, 2023, **1225**, 114135.

(17) A. Bhattacharya, **P. A. Praveen** and K. Thangavel, "A Combined Theoretical and Experimental Approach to Deduce the Role of Dielectric Layer on Interface Trap Density in Single Crystal Organic Field-Effect Transistors", *Crystal Research and Technology*, 2023, **58**, 2200263.

(16) A. Bleahu, S. Gopinath, T. Kahro, **P. A. Praveen**, A. S. J. F. Rajeswary, S. Prabhakar, R. Kumar, G. R. Salla, R. P. Singh, K. Kukli et al., "3D incoherent imaging using an ensemble of sparse self-rotating beams", *Optics Express*, 2023, **31**, 26120–26134, (Available open access).

(15) A. Jayavel, S. Gopinath, **P. A. Praveen**, F. G. Arockiaraj, A. Bleahu, A. P. I. Xavier, D. Smith, M. Han, I. Slobozhan, S. H. Ng et al., "Improved classification of blurred images with deep-learning networks using lucy-richardson-rosen algorithm", *Photonics*, 2023, **10**, 396, (Available open access).

(14) S. Gopinath, **P. A. Praveen**, T. Kahro, A. Bleahu, F. G. Arockiaraj, D. Smith, S. H. Ng, S. Juodkazis, K. Kukli, A. Tamm et al., "Implementation of a large-area diffractive lens using multiple sub-aperture diffractive lenses and computational reconstruction", *Photonics*, 2022, **10**, 3, (Available open access).

(13) M. Han, D. Smith, S. H. Ng, T. Katkus, A. S. John Francis Rajeswary, **P. A. Praveen**, K. R. Bambery, M. J. Tobin, J. Vongsvivut, S. Juodkazis et al., "Single shot lensless interferenceless phase imaging of biochemical samples using synchrotron near Infrared Beam", *Biosensors*, 2022, **12**, 1073, (Available open access).

(12) **P. A. Praveen**, F. G. Arockiaraj, S. Gopinath, D. Smith, T. Kahro, S.-M. Valdma, A. Bleahu, S. H. Ng, A. N. K. Reddy, T. Katkus et al., "Deep deconvolution of object information modulated by a refractive lens using Lucy-Richardson-Rosen algorithm", *Photonics*, 2022, **9**, 625, (Available open access).

(11) **P. A. Praveen**, A. Bleahu, F. Arockiaraj, S. Gopinath, D. Smith, S. Ng, A. Rajeswary, S. Juodkazis and V. Anand, "Digital refocusing of images recorded with white light using Lucy-Richardson-Rosen algorithm", *Asian Journal of Physics*, 2022, **31**, 1027–1034, (Available open access).

(10) **P. A. Praveen**, P. Muthuraja, P. Gopinath and T. Kanagasekaran, "Impact of furan substitution on the optoelectronic properties of biphenylyl/thiophene derivatives for light-emitting transistors", *The Journal of Physical Chemistry A*, 2022, **126**, 600–607.

(9) D. Smith, S. Gopinath, F. G. Arockiaraj, A. N. K. Reddy, V. Balasubramani, R. Kumar, N. Dubey, S. H. Ng, T. Katkus, **P. A. Praveen** et al., "Nonlinear reconstruction of images from patterns generated by deterministic or random optical masks—concepts and review of research", *Journal of Imaging*, 2022, **8**, 174, (Available open access).

(8) V. L. Vineela, **P. A. Praveen**, T. Kanagasekaran, N. Kumar and N. N. Murty, "Direct x-ray detection using thin-film pentacene Schottky diodes", *Journal of Instrumentation*, 2022, **17**, P02024.

(7) **P. A. Praveen**, A. Bhattacharya and T. Kanagasekaran, "A DFT study on the electronic and photophysical properties of biphenylyl/thiophene derivatives for organic light emitting transistors", *Materials Today Communications*, 2020, **25**, 101509.

(6) **P. A. Praveen** and R. R. Babu, "Evaluation of nonlinear optical properties from molecular descriptors of benzimidazole metal complexes by principal component analysis", *Journal of Molecular Graphics and Modelling*, 2019, **93**, 107447.

(5) **P. A. Praveen**, R. R. Babu, P. Balaji, A. Murugadas and M. Akbarsha, "Laser assisted anticancer activity of benzimidazole based metal organic nanoparticles", *Journal of Photochemistry and Photobiology B: Biology*, 2018, **180**, 218–224.

(4) **P. A. Praveen**, R. R. Babu and K. Ramamurthi, "Role of annealing on the structural and optical properties of nanostructured diaceto bis-benzimidazole Mn (II) complex thin films", *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 2017, **173**, 800–808.

(3) **P. A. Praveen**, R. R. Babu and K. Ramamurthi, "Theoretical and experimental investigations on linear and nonlinear optical response of metal complexes doped PMMA films", *Materials Research Express*, 2017, **4**, 025024.

(2) **P. A. Praveen**, R. R. Babu, K. Jothivenkatachalam and K. Ramamurthi, "Spectral, morphological, linear and nonlinear optical properties of nanostructured benzimidazole metal complex thin films", *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 2015, **150**, 280–289.

(1) **P. A. Praveen**, S. Prabhakaran, R. R. Babu, K. Sethuraman and K. Ramamurthi, "Low power optical limiting studies on nanocrystalline benzimidazole thin films prepared by modified liquid phase growth technique", *Bulletin of Materials Science*, 2015, **38**, 645–651.

Conference Proceedings

(12) K. Arulkannan, V. B. Sreegowri, S. Vigneshwaran, **P. A. Praveen**, B. Arka and K. Thangavel, DAE SSPS - 2023 Symposium (Accepted), AIP Conference Proceedings.

(11) H. Pratik, D. Saravanapriya, J. Jesmal, **P. A. Praveen** and K. Thangavel, DAE SSPS - 2023 Symposium (Accepted), AIP Conference Proceedings.

(10) D. Saravanapriya, H. Pratik, V. B. Sreegowri, K. Arulkannan, **P. A. Praveen** and K. Thangavel, DAE SSPS - 2023 Symposium (Accepted), AIP Conference Proceedings.

(9) A. Bleahu, S. Gopinath, R. Kumar, F. G. Arokiaraj, D. Smith, T. Kahro, **P. A. Praveen**, S. H. Ng, A. Pristy, T. Katkus et al., Practical Holography XXXVII: Displays, Materials, and Applications, 2023, vol. 12445, pp. 190–193.

(8) A. Bleahu, S. Gopinath, A. P. I. Xavier, T. Kahro, A. N. K. Reddy, F. G. Arockiaraj, D. Smith, S. H. Ng, T. Katkus, **P. A. Praveen** et al., Holography: Advances and Modern Trends VIII, 2023, vol. 12574, pp. 153–157.

(7) S. Gopinath, **P. A. Praveen**, F. G. Arokiaraj, D. Smith, T. Kahro, S.-M. Valdma, A. Bleahu, S. H. Ng, A. N. K. Reddy, T. Katkus et al., AI and Optical Data Sciences IV, 2023, vol. 12438, pp. 329–333.

(6) S. Gopinath, A. P. I. Xavier, **P. A. Praveen**, T. Kahro, O. Tamm, A. Bleahu, F. G. Arockiaraj, D. Smith, S. H. Ng, S. Juodkazis et al., Holography: Advances and Modern Trends VIII, 2023, vol. 12574, pp. 162–165.

(5) M. Han, D. Smith, S. H. Ng, T. A. Katkus, A. S. J. F. Rajeswary, **P. A. Praveen**, M. J. Tobin, J. Vongsvivut, S. Juodkazis and V. Anand, Practical Holography XXXVII: Displays, Materials, and Applications, 2023, vol. 12445, pp. 200–204.

(4) **P. A. Praveen** and R. R. Babu, AIP Conference Proceedings, 2017, vol. 1832.

(3) **P. A. Praveen** and R. R. Babu, AIP Conference Proceedings, 2016, vol. 1731.

(2) **P. A. Praveen**, R. R. Babu and K. Ramamurthi, AIP Conference Proceedings, 2015, vol. 1665.

(1) **P. A. Praveen**, R. R. Babu, S. Prabhakaran and K. Ramamurthi, AIP Conference Proceedings, 2014, vol. 1591, p. 991.

Book Chapters

(1) **P. A. Praveen** and T. Kanagasekaran, in *Handbook of Semiconductors: Fundamentals to Emerging Applications*, CRC Press, 2024, p. 81.

Funding

- Grant-in-Aid for JSPS Fellows (No. 23KF0101) – Multiyear funding of ¥2,000,000

Awards

- 2024 – **IOP Outstanding Reviewer 2023**, for the journal Physica Scripta
- 2024 – **IOP Trusted Reviewer** - For exceptionally high level peer review competency
- 2023 – **JSPS Postdoctral Fellowship** – Post Doctoral Research, Tohoku University, Japan
- 2022 – **ERA Chair Postdoctral Fellowship** – Post Doctoral Research, University of Tartu, Estonia
- 2019 – **Research Fellowship Award** – Post Doctoral Research, IISER Tirupati, India
- 2017 – **Best Paper Award** – 21st National Seminar on Crystal Growth and Applications, National College, Tiruchirapalli
- 2016 – **Research Fellowship for Meritorious Students in Science** – SRF, UGC, India
- 2016 – **Best Paper Award** – National Conference on Computational and Experimental Physics of Functional Materials, K.S.R College, Tiruchengode
- 2014 – **Third Prize** – DST SERB School on DFT and Beyond, M. S. University, Vadodara
- 2014 – **Research Fellowship for Meritorious Students in Science** – JRF, UGC, India

Co-Supervision of Graduate Students

- **2021** – BSMS Vth year Project
  Fabrication of organic photodetectors for broadband detection
- **2019** – BSMS Vth year Project
  Effect of different dielectric layers on the mobility of OSCs
- **2018** – M. Sc., Project
  NLO properties of transistion metal substituted ZIF structures
- **2017** – M. Phil., Project
  Copper based metal organic frameworks for nonlinear optical applications

- **2017** – M. Sc., Project
  Theoretical & experimental analysis of optical properties of cadmium based ZIF structures
- **2016** – M. Sc., Project
  ZIF-8 thin films for nonlinear optical applications
- **2015** – M. Sc., Project
  Pd doped ZnO nanoparticels for nonlinear optical applications
- **2014** – M. Sc., Project
  Synthesis of new quinoline derivative for nonlinear optical applications

Teaching

- 2022 – **Associate Lecturer** – Graduate Physics Course: Diffractive Optical Elements | `(Class of 7 Students)`
- 2021 – **Tutor** – BSMS - UG Physics: Mechanics & Optics | `(Class of 40 Students)`
- 2020 – **Tutor** – BSMS - UG Physics: Mechanics & Optics | `(Class of 46 Students)`
- 2019 – **Tutor** – BSMS - Advanced Physics: Optics | `(Class of 23 Students)`
- 2019 – **Tutor** – BSMS - UG Physics: Mechanics & Optics | `(Class of 33 Students)`
- 2018 – **Tutor** – M. Sc., (II Year) - Materials Science | `(Class of 37 Students)`
- 2017 – **Tutor** – M. Sc., (II Year) - Materials Science | `(Class of 41 Students)`

Invited Talks

- Apr, 2024 – **Hands-on workshop: LaTeX, Chennai Institute of Technology, Chennai**
  Beyond the basics: Version control and more
- Jul, 2022 – **Photonics Summer School, University of Tartu, Estonia**
  Organic lasers: concepts, challenges and the story so far
- Jun, 2021 – **Sri Krishna College of Technology, Coimbatore**
  Roadmap for Research Writing
- Jul, 2020 – **Jamal Mohamed College (Autonomous), Tiruchirappalli**
  Skill Development using Learning Assistance Tools
- Jun, 2020 – **Jamal Mohamed College (Autonomous), Tiruchirappalli**
  Summer School for Online Training on LaTeX
- Jun, 2020 – **Hindustan College of Engineering & Technology, Coimbatore**
  Unveiling Molecules: A Computational Materials Science Perspective
- May, 2020 – **Karpagam College of Engineering, Coimbatore**
  Methods and Tools for Qualitative Research Writing
- Feb, 2018 – **Dr. SNSR College of Arts & Science, Coimbatore**
  One Day Workshop on LaTeX

Selected Academic Activities

- **Reviewer:** Journal of Physics: Materials, Materials Research Express, Nanotechnology, Physica Scripta, Journal of Materials Science: Materials in Electronics, Spectrochimica Acta Part A.
- **Organizing Team** – Nov. 2022 – CIPHR Hackathon, University of Tartu
- **Organizing Secretary** – Feb. 2018 and Feb. 2019 - PACE (2018 & 2019), Department of Physics, Bharathidasan University
- **Joint Secretary & Joint Treasurer** – Jun. 2018 - Apr. 2019 – Bharathidasan University Physics Forum
- **Secretray** – Jul. 2007 - Jun. 2008 – Physics Club, Department of Physics, K. K. College (Periyar University), Namakkal
- **Joint-Secretray** – Sep. 2006 - Jun. 2007 – Physics Club, Department of Physics, K. K. College (Periyar University), Namakkal