BIKRAM KESHARI PARIDA

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Education

Ph.D in Information and Communication Engineering **2023 – Feb, 2026**
Sun Moon University *Asan-Si, South Korea*
CGPA: 4.42/4.5
Thesis title: DentAI Dyad: 3D Oral Anatomy Reconstruction from a Single Panoramic X-Ray Radiograph

Master of Science in Physics **2017 – 2019**
Pondicherry University *Puducherry, India*
CGPA: 8.34/10
Thesis title: Unification schemes of AGN through dusty torus

Bachelor of Science in Physics (Hons.) **2013 – 2016**
Sambalpur University *Odisha, India*
Percentage: 78.1 %

Skills & Programming Languages

- ✓ Artificial Intelligence
- ✓ Machine Learning
- ✓ Deep learning
- ✓ Python
- ✓ TensorFlow/Keras
- ✓ PyTorch
- ✓ Mathematica
- ✓ Maplesoft
- ✓ Origin 9.1
- ✓ Parallel Computing
- ✓ SKIRT code

Research Interests

- ✓ Computer Vision & Image Processing
- ✓ Generative AI
- ✓ Physics Informed Neural Network
- ✓ Agentic AI, LLM
- ✓ Quantum Machine Learning
- ✓ Probabilistic Machine Learning
- ✓ Many-body Quantum dynamics
- ✓ Quantum Computing

Work Experience

Research Assistant **March 2023 – Present**
Artificial Intelligence & Image Processing Lab., Sun Moon University - onsite, full-time *S. Korea*

- **Project 1: K-U-KAN: Fast Single-View PX → CBCT Reconstruction** : Developed a physics- and geometry-guided deep learning pipeline to reconstruct 3D CBCT volumes from a single panoramic X-ray. The method combines Kolmogorov–Arnold Networks for depth-aware feature lifting, Koopman-based linear token dynamics, and a lightweight 3D attention U-KAN refiner along focal-trough rays. Achieves sharper dental anatomy, improved perceptual quality, robustness to native radiographic intensities, and 2× faster training compared to transformer and implicit neural baselines.
- **Project 2:** Created a robust, lightweight, and memory-efficient algorithm based on Vision Transformer and Neural Radiance Field for 3D reconstruction of the oral anatomy from a single panoramic X-ray radiograph, eliminating the need for a flattened volume and prior dental arch information.
- **Project 3:** Developed a novel algorithm for automatic jaw detection from CBCT data, eliminating the need for manual delineation of the dental arch. This method enhances the evaluation of patient-specific jaw shapes and creates optimized panoramic views, proving effective even for patients without teeth or with heavy metal implants.
- **Project 4:** Developed a data-driven approach using Temporal Convolutional Networks (TCN) to model input-output time series data for high-dimensional quantum systems, optimizing the minimal architecture to measure system complexity. Demonstrated the effectiveness of TCN in capturing dynamics of quantum systems during High Harmonic Generation and compared this method with amplitude-aware permutation entropy for predicting system complexity.

Data Science Trainer **July 2023 – Dec 2023**
AI Club - online

- Developed curriculum, prepared lectures, and mentored high school students (from USA) in AI/ML.

Guest Faculty **June 2019 - Dec 2022**
Dept.of Physics, Shree Education Scholars' Residential College - onsite, full-time *Odisha, India*

- Taught Physics to undergraduate students.

Summer internship programme **2018**
Indian Institute of Astrophysics *Bangalore, India*

- Project title: **Non-thermal synchrotron emission of ultra-relativistic particles associated with Coronal Mass Ejection.**

Summer School in Physics and Astrophysics **2018**
Indian Institute of Astrophysics *Bangalore, India*

- **Kodaikanal H-alpha brightening observation associated with a propagation of excitor of Coronal Type V Solar Radio Burst**: Completed under the supervision of Scientist/Dr. Edwin Ebenezer, Indian Institute of Astrophysics, India.

Poster /Presentations in AI

- Exploring Jaw Morphology and Patient-specific Dynamic Rotation Trajectory using Cone Beam Computed Tomography. **(2024)**
  The 7th International Conference on Communication Engineering and Technology (ICCET 2024)
  Tokyo, Japan.

- Recent Advances in 3D Oral Reconstruction from Panoramic X-Ray Imaging: A Review.**(2023)**
  Korean Artificial Intelligence Association Fall Conference 2023
  Sky Hall, 28th floor, Naver 1784 (Jeja-dong, Bundang-gu), S. Korea.

- Transforming Dental Imaging: 3D Reconstruction from Single PX- Ray Radiograph **(2023)**
  Proceeding of the Korea Artificial-Intelligence Convergence Technology Society
  Konyang University, South Korea.

- Clinically applicable 3D reconstruction of teeth from a single panoramic X-Ray radiograph using Deep Learning methods: A feasibility study. **(2023)**
  Electronics, Semiconductor, Artificial Intelligence Conference
  Gangneung-Wonju National University, South Korea.

Conference Attended

- The Vienna Summer School 2020 on Gravitational Quantum Physics (Virtual)
  Sept 3-6, 2020, University of Vienna, Austria.

- (Virtual) Strings 2020
  June 29, 2020– July 3, 2020, University of Cape Town, South Africa.

- 23rd Capra Meeting on Radiation Reaction in General Relativity(Virtual)
  June 22 -26, 2020, University of Texas, at Austin, USA.

Invited Talks

- **Exploring the World of Classical & Quantum Machine Learning : A journey into AI and Quantum Physics**, *onsite*- Nov 13, 2024 - Chung Nam Samsung Academy, Asan-Si, South Korea.

- **Add-on course on AI & Quantum Computing,** *online*- Nov 25 - Dec 10, 2024 - Department of Physics, Malda College, India.

Achievements

- Received 1.5 Million KRW for best poster presentation from BrainKorea21 (Jan 2025)

- Qualified in "National Graduate Physics Examination (NGPE)" (2016 (state topper), 2015, 2014)

- Awarded a laptop from the Government of Odisha, India for outstanding performance in Higher Secondary Examination (2013)

Publications: Google Scholar Link

Artificial Intelligence:

1. **B.K. Parida**, A. Sen, W. You; **K-U-KAN: Koopman-Enhanced U-KAN for 3D Dental Reconstruction from a Single Panoramic X-ray Radiograph** (Ready to submit in ICML).

2. A. Sen, G. Maiti, **B.K. Parida** et al; **Feature Engineering is Not Dead: Reviving Classical Machine Learning with Entropy, HOG, and LBP Feature Fusion for Image Classification** (In review in Pattern recognition https://arxiv.org/abs/2507.13772).

3. **B.K. Parida** et al; **ViT-NeBLa: A Hybrid Vision Transformer and Neural Beer–Lambert Framework for Single-View 3D Reconstruction of Oral Anatomy From Panoramic Radiographs** (IEEE Access, vol. 13, 2025, pp. 170761–81; https://doi.org/10.1109/ACCESS.2025.3613789)

4. A. Sen, **B.K. Parida**, D. Bonder; **Input-Output Optics as a Causal Time Series Mapping: A Generative Machine Learning Solution.** (https://doi.org/10.1103/PhysRevResearch.7.023015)

5. Anusree P.S., **B.K. Parida**, S.Y. Moon, W.You; **Panoramic X-ray Synthesis from Dental CBCT Using Patient-tailored Simulated Geometry with Uniform Projection Sampling.** (IEEE Access, vol. 13, pp. 100752–100763, 2025 https://doi.org/10.1109/ACCESS.2025.3573744)

6. S. Patra, S. Panda, **B.K. Parida** *et al.*; **Physics Informed Kolmogorov-Arnold Neural Networks for Dynamical Analysis via Efficent-KAN and WAV-KAN.** (Journal of Machine Learning Research; vol. 26, no. 233, pp. 1–39, 2025 https://arxiv.org/abs/2407.18373; http://jmlr.org/papers/v26/24-1278.html)

7. Anusree P.S., **B.K. Parida**, W.You; **Exploring Jaw Morphology and Patient-specific Dynamic Rotation Trajectory Using Cone Beam Computed Tomography.**
(2024 7th International Conference on Communication Engineering and Technology (ICCET), IEEE, 2024, pp. 81–85. https://doi.org/10.1109/ICCET62255.2024.00021)

8. Anusree P.S., **B.K. Parida**, W.You; **Recent Advances in Dental Panoramic X-Ray Synthesis and its Clinical Applications.** (IEEE Access, 2024, pp. 1–1 https://doi.org/10.1109/ACCESS.2024.3422650)

Physics & Mathematics :

1. S. Das, S. Ray, **B.K. Parida** et al ; **A study on anisotropic compact stellar model under color-flavor locked equation of state** (Chinese Journal of Physics, vol. 90, Aug. 2024, pp. 474–93 https://doi.org/10.1016/j.cjph.2024.04.001).

2. **B.K. Parida**, A.Sen; **GUP modified Wigner function using classical-quantum unified framework**; (Indian Journal of Physics, March 2024. https://doi.org/10.1007/s12648-024-03086-7).

3. **B.K. Parida**, A.Sen, S.Dhasmana, Z.K. Silagadze; **Lévy-Leblond Equation and Eisenhart-Duval lift in Koopman-von Neumann Mechanics;** (Modern Physics Letters A, Nov. 2023, p. 2350149).

4. S. Ray, S. Das, K.K. Ghosh, **B.K. Parida**, S.K. Pal, Moumita Indra; **Study of anisotropic compact stars by exploring tidal deformability;** (New Astronomy, vol. 104, Nov. 2023, p. 102069).

5. **B.K. Parida**, S.Das, M.Govender; **Toy models of compact anisotropic stars and their Love numbers;** (International Journal of Modern Physics D, vol. 32, no. 06, Apr. 2023, p. 2350038).

6. A.Sen, **B.K. Parida**, S. Dhasmana, Z. K. Silagadze; **Eisenhart lift of Koopman-von Neumann mechanics**; (Journal of Geometry and Physics 185 (2023) 104732, arXiv:2207.05073).

7. **B.K. Parida**, S.Majumder, S.Das, K.Chakraborty, F.Rahaman; **Anisotropic compact stellar model of embedding class one satisfying Karmarkar's condition**; (Commun. Theor. Phys. 75, 025403).

8. S.Das, **B.K. Parida**, R. Sharma, F. Rahaman; **Central Pressure-Dependent Compact Anisotropic Stellar Model and Its Tidal Love Number.** (Eur. Phys. J. Plus 137, 1092 (2022)).

9. S.Das, **B.K. Parida**, K. Chakraborty, S. Ray.; **Anisotropic compact star with a linear pressure-density relationship**; (International Journal of Modern Physics D, Vol. 31, No. 07, 2250053 (2022)).

10. P.Bhar, S.Das, **B.K. Parida**; **Compact Stellar Model in Tolman Spacetime in the Presence of Pressure Anisotropy**, (International Journal of Geometric Methods in Modern Physics, vol. 19, no. 06, May 2022, p. 2250095).

11. S.Das, **B.K. Parida**, R.Sharma; **Estimating tidal Love number of a class of compact stars**, (Eur. Phys. J. C 82, 136 (2022)).

12. S.Das, S.Ray, M.Khlopov, **B.K. Parida**; **Anisotropic compact stars: Constraining model parameters to account for physical features of tidal Love numbers,** https://arxiv.org/abs/2102.07099, (Annals of Physics, vol. 433, Oct. 2021, p. 168597).

13. S.Das, **B.K. Parida**, S.Ray, S.K.Paul; **Role of anisotropy on the tidal deformability of compact stellar objects**; Phys. Sci. Forum 2021, 2(1), 29; https://doi.org/10.3390/ECU2021-09311, (Published in the journal MDPI).

14. **B.K. Parida**, S.Das; **Some astrophysical aspects of star and its evolution: A brief review**, IJMAR, Vol. 7 , No. 1 & 2, Page 1 -13 (2020). Click here.

15. **B.K. Parida**; **Unification Schemes of AGN through dusty torus** (Master thesis). http://dx.doi.org/10.13140/RG.2.2.12517.32483 (2019).

Referee

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