

BIO-DATA

Dr. Krishna Kingkar Pathak

Associate Professor, Department of Physics

Arya Vidyapeeth College (Autonomous), Guwahati, Assam, India

1. Name and full correspondence address

Dr. Krishna Kingkar Pathak, Department of Physics, Arya Vidyapeeth College (Autonomous), Gopinath Nagar, Guwahati – 781016, Assam, India.

2. Email(s), contact number and researcher identifier

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3. Institution and academic role

Arya Vidyapeeth College (Autonomous), Guwahati, Assam, India. Recognised Ph.D. supervisor under Gauhati University. The PI's employment institution is Arya Vidyapeeth College (Autonomous).

4. Date of birth: 31 December 1980

5. Gender: Male

6. Category: Scheduled Caste (SC)

7. Whether differently abled: No

8. Academic qualifications (undergraduate onwards)

Degree / qualification	Year	Subject	University / institution	Result (%)
B.Sc.	2002	Physics (Major), Chemistry, Mathematics	Bajali College (Gauhati University)	68.2
M.Sc.	2004	Physics	Gauhati University	71.7
Ph.D.	2014	Physics	Gauhati University	–
CSIR-NET	2005	Physics	CSIR	Qualified

9. Ph.D. thesis

Heavy-Light Mesons in a QCD Potential Model.

Research guide: Prof. D. K. Choudhury, Gauhati University (2014).

10. Work experience

S. No.	Position	Institution	From	To	Pay scale
1	Assistant Professor (Stage I)	Arya Vidyapeeth College	01/02/2006	31/01/2012	AGP 6000
2	Assistant Professor (Stage II)	Arya Vidyapeeth College	01/02/2012	31/01/2017	AGP 7000
3	Assistant Professor (Selection Grade)	Arya Vidyapeeth College	01/02/2017	31/03/2024	AGP 8000
4	Associate Professor	Arya Vidyapeeth College (Autonomous)	01/04/2024	Present	Level 13A

11. Professional recognition

CSIR-NET qualified in Physics, 2005.

12. Publications (19 journal papers; one accepted)

- Pathak, K. K., “Universal Response Functions in Driven Dissipative Tunneling Dynamics,” *Chaos*, **36** (2026), 073105. Editor’s Pick; single-author paper. DOI: <https://doi.org/10.1063/5.0332380>.
- Pathak, K. K., “Universal nonlinear scaling of quantum tunneling with isotope mass,” *Chaos, Solitons & Fractals*, **204** (2026), 117737. Single-author paper. DOI: <https://doi.org/10.1016/j.chaos.2025.117737>.
- Pathak, K. K., “Mass-scaling of quantum tunnelling in hydrogen bonds: Analytical model and comparison with multidimensional potentials,” *Chemical Physics*, **607** (2026), 113203. Single-author paper. DOI: <https://doi.org/10.1016/j.chemphys.2026.113203>.
- Pathak, K. K., “Consistency of Dalgarno–Lewis perturbation theory for confining two-body systems: second-order

corrections in the Cornell potential,” *Few-Body Systems*, **67**(2) (2026), Article 21. DOI: <https://doi.org/10.1007/s00601-026-02041-y>.

5. **Pathak, K. K.**, “Universal exponential scaling of isotope-dependent quantum tunneling splittings,” *Chemical Physics*, **609** (2026), 113253. Single-author paper. DOI: <https://doi.org/10.1016/j.chemphys.2026.113253>.
6. **Pathak, K. K.**, “Benchmarking proton tunneling splittings with a wavefunction-based double-well model,” *Pramana* (accepted 29 April 2026; manuscript no. PRAM-D-26-00105R1). Single-author paper; listed as accepted, not yet as a final issue publication.
7. **Pathak, K. K.**, “Hyperfine structure of B and D mesons in a QCD-inspired potential model,” *European Physical Journal Plus*, **140** (2025), 1069.
8. Das, T.; **Pathak, K. K.**; Choudhury, D. K., “Three-loop effect in r.m.s. and charge radii of heavy flavored mesons in a QCD potential model,” *International Journal of Theoretical Physics*, **63** (2024), 172.
9. **Pathak, K. K.**; Bhattacharya, S.; Das, T., “Weak decays of B_c meson in a QCD potential model,” *Indian Journal of Physics*, **97** (2023), 3685–3689. DOI: <https://doi.org/10.1007/s12648-023-02716-w>.
10. **Pathak, K. K.**; Bhattacharya, S.; Das, T., “Parameterisation space for Cornell potential in a QCD potential model,” *European Physical Journal C*, **82** (2022), 1081. DOI: <https://doi.org/10.1140/epjc/s10052-022-11061-x>.
11. Das, T.; Choudhury, D. K.; **Pathak, K. K.**; Bordoloi, N. S., “Charge radii and leptonic decay constants of heavy-light mesons in a potential model,” *Indian Journal of Physics*, **95**(5) (2021), 967–980. DOI: <https://doi.org/10.1007/s12648-020-01769-5>.
12. Das, T.; Choudhury, D. K.; **Pathak, K. K.**, “Isgur–Wise function and a new approach to potential model,” *International Journal of Modern Physics A*, **31** (2016), 1650189.
13. Das, T.; Choudhury, D. K.; **Pathak, K. K.**, “RMS and charge radii in a potential model,” *Indian Journal of Physics*, **90** (2016), 1307.
14. Choudhury, D. K.; **Pathak, K. K.**, “On the bounds of CKM element V_{cb} in a potential model,” *International Journal of Modern Physics A*, **29** (2014), 1450066.
15. **Pathak, K. K.**; Choudhury, D. K., “Semileptonic decay of B_c meson into $c\bar{c}$ states in a QCD potential model,” *International Journal of Modern Physics A*, **28** (2013), 1350097.
16. **Pathak, K. K.**; Choudhury, D. K., “Heavy-light mesons in a QCD potential model with relativistic effects,” *International Journal of Modern Physics A*, **28** (2013), 1350010.
17. **Pathak, K. K.**; Choudhury, D. K., “Open flavour charmed mesons in a quantum chromodynamics potential model,” *Pramana*, **79** (2012), 1385.
18. **Pathak, K. K.**; Choudhury, D. K., “The Oscillation Frequency of B and $\bar{B}$ Mesons in a QCD Potential Model with Relativistic Effects,” *Chinese Physics Letters*, **28**(10) (2011), 101201. DOI: <https://doi.org/10.1088/0256-307X/28/10/101201>.
19. Hazarika, B. J.; **Pathak, K. K.**; Choudhury, D. K., “Isgur–Wise function in a QCD potential model with Coulombic potential as perturbation,” *Modern Physics Letters A*, **26** (2011), 1547.

13. Patent applications and design registrations

S. No.	Title	Applicant(s)	Application / design no.	Date supplied	Status
1	A Method for Controlling and Predicting Quantum Tunneling via Mass-Tensor Engineering	Dr. K. K. Pathak	202531119523	26-12-2025	Published application (India)
2	A Computer-Implemented Method for Predicting and Influencing a Quantum-Tunneling Rate in a Physical Quantum System	Dr. K. K. Pathak	202531119524	26-12-2025	Published application (India)
3	A Quantum Tunneling Rate Control Device Using Mass-Tensor Modulation	Dr. K. K. Pathak	202531119525	26-12-2025	Published application (India)
4	Inverse Design of Quantum Tunneling Rates using Determinant Constraints in Mass-Tensor Space	Dr. K. K. Pathak	202631014852	27-03-2026	Published application (India; as confirmed by PI)
5	Robust Control of Quantum Tunneling Rate in a Molecular System	Dr. K. K. Pathak	202631014854	27-03-2026	Published application (India; as confirmed by PI)
6	Engineering Enzymatic Catalysis via Optimization of Quantum Tunneling Pathways	Dr. K. K. Pathak	202631014855	27-03-2026	Published application (India; as confirmed by PI)

7	Modular Solar Powered Phone Charging Station	Dr. Sankar Barman; Dr. Krishna Kingkar Pathak; Er. Mehedi Alom	465797-001	15-07-2025	Design registered
8	Biochar Dispensing Device	Dr. Krishna Kingkar Pathak; Dr. Roshmi Boruah; Er. Mehedi Alom; Dr. Sankar Barman	484033-001	16-12-2025	Design registered
9	Smart Kitchen Waste Management Device for Integrated Resource Generation	Dr. Sankar Barman; Dr. Krishna Kingkar Pathak	463982-001	29-06-2025	Design registered

Patent entries are described as published applications, not granted patents. Dates and titles should match the official Patent Office records.

14. Books

S. No.	Title	Authors	Publisher	Year
1	<i>A Handbook of Statistical Physics and Thermodynamics</i>	V. S. Bhatia; Manoj Kumar Mahanta; K. K. Pathak	Vishal Publishing Co.	2016
2	<i>Fundamentals of Electronics</i>	K. C. Bali; Parminder Kaur; K. K. Pathak	Vishal Publishing Co.	2018
3	<i>Mathematical Physics – I</i>	K. K. Pathak; Sangeeta Prasher	Vishal Publishing Co.	2020
4	<i>Mathematical Physics – II</i>	K. K. Pathak; Sangeeta Prasher	Vishal Publishing Co.	2021
5	<i>Mathematical Physics – III</i>	K. K. Pathak; Sangeeta Prasher	Vishal Publishing Co.	2021
6	<i>Thermal Physics</i>	K. K. Pathak; Poppy Hazarika	Vishal Publishing Co.	2021
7	<i>Mechanics</i>	Dilip Sarma; K. K. Pathak	Vishal Publishing Co.	2021
8	<i>Analog Systems and Applications</i>	Parminder Kaur; K. K. Pathak	Vishal Publishing Co.	2020
9	<i>Leptonic and Semileptonic Decay of B and D Mesons</i>	D. K. Choudhury; K. K. Pathak	Lambert Academic Publishing	2014

15. Research supervision, academic responsibilities and other information

Dr. Krishna Kingkar Pathak is an Associate Professor in the Department of Physics at Arya Vidyapeeth College (Autonomous), Guwahati, Assam, and a recognised Ph.D. supervisor under Gauhati University. He is currently supervising three registered research scholars working in High Energy Physics and Nonlinear Dynamics.

His research interests include quantum tunnelling, isotope-dependent tunnelling, semiclassical methods, driven and dissipative quantum systems, computational/theoretical physics, and QCD-inspired potential models. His research output includes single-author and collaborative journal papers, published patent applications, registered industrial designs, and books in physics.

He has served as a reviewer for international journals including *Reports on Progress in Physics*, *Nuclear Physics B*, *Frontiers in Physics*, *Physica Scripta*, and *The Journal of Physical Chemistry Letters*. He has also delivered invited talks at international conferences and served as a resource person at academic and research workshops.

Completed research project

Principal Investigator, UGC Minor Research Project, *Study of Heavy-Light Mesons*, sanctioned grant INR 1,35,000, UGC North Eastern Regional Office. The UGC sanction letter is dated 29 June 2012; the college forwarded the final report and utilisation certificate on 29 September 2014. The project had no Co-PI. The precise commencement and completion dates should be taken from the project records.