



Arun Jacob Mathew

Presently working as:

Assistant Professor

Department of Physics

St. Stephen's College, University of Delhi, Delhi, India.

Education

- **Doctor of Philosophy (PhD.) in Engineering**

Department of Physics and Information Technology

Graduate School of Computer Science and Systems Engineering

Kyushu Institute of Technology, Japan.

(April 2021 – March 2025)

- **Master of Science (MSc.) in Physics**

Department of Physics and Astrophysics

University of Delhi, India.

(July 2017 – May 2019)

- **Bachelor of Science (BSc.) Honours in Physics**

Department of Physics

St. Stephen's College, University of Delhi, India.

(July 2014 – May 2017)



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Age

30 years



Publications

• Doctoral Thesis

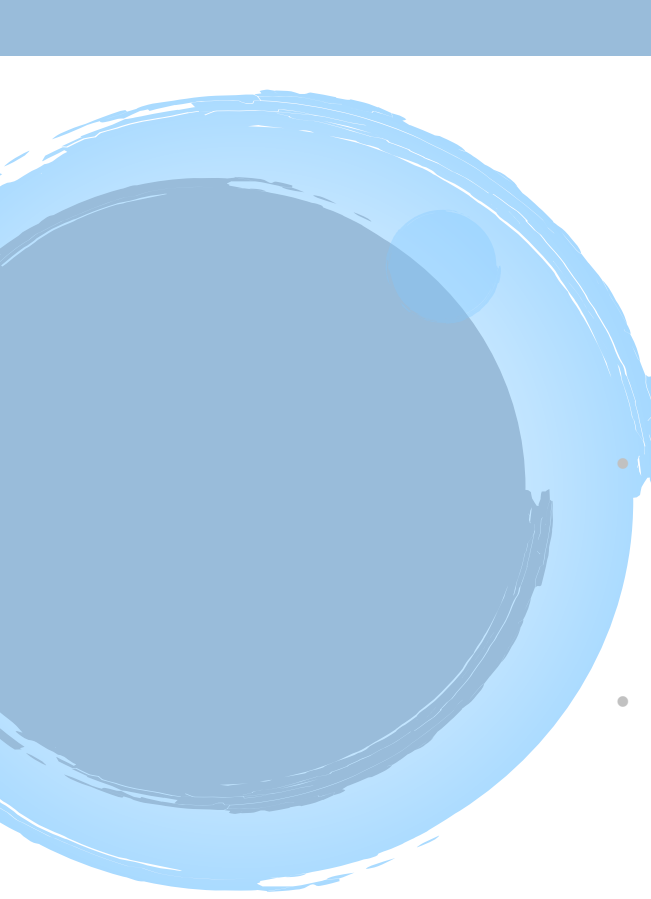
“Spin orbit torque driven control of magnetization and its application in Boolean logic and neuromorphic computing”

under the supervision of Prof. Yasuhiro Fukuma,
Department of Physics & Information Technology
Graduate School of Computer Science and Systems Engineering
Kyushu Institute of Technology, Japan.

Online link: <https://kyutech.repo.nii.ac.jp/records/2002281>

• Journal Publications

- K. Shintaku*, **A. J. Mathew***, A. Iwamoto, M. Mohammadi, H. Awano, H. Asada, Y. Fukuma, “Efficient spin-orbit torque driven magnetization switching of GdFe using phosphorus-implanted platinum layer”, [Applied Physics Letters](#), Vol. 127, No. 1, pp. 012410 1-8 (2025). (* = Equal authors)
- **A. J. Mathew**, A. Iwamoto, M. Mohammadi, H. Awano, H. Asada, Y. Fukuma, “Enhancement in the Performance of Spin–Orbit Torque Driven Programmable Logic Using Nitrogen Doped Pt”, [ACS Applied Electronic Materials](#), Vol. 7, No. 9, pp. 4363-4370 (2025).
- U. Shashank, T. Tomoda, **A. J. Mathew**, G. Vashisht, K. Imai, Y. Kusaba, C.-L. Dong, C.-L. Chen, Y. Horibe, M. Ishimaru, H. Awano, H. Asada, Y. Fukuma, “Giant spin-orbit torque induced by spin Hall effect in amorphous Pt(P) alloys,” [NPG Asia Materials](#), Vol. 17, No. 1, pp. 15 1-8 (2025)
- **A. J. Mathew**, J. R. Mohan, C. Yamanaka, K. Shintaku, M. Mohammadi, H. Awano, H. Asada, Y. Fukuma, “Modulation of nonlinearity and asymmetry in a spin–orbit torque driven artificial synapse”, [Applied Physics Letters](#), Vol. 126, No. 8, pp. 082405 1-7 (2025). (selected as Featured Article)
- R. Feng, J. R. Mohan, C. Yamanaka, Y. Hasunaka, **A. J. Mathew**, Y. Fukuma, “Micromagnetic Analysis of Magnetic Vortex Dynamics for Reservoir Computing”, [Journal of Physics: Condensed Matter](#), Vol. 36, No. 48, pp. 485802 1-9 (2024).
- G. Vashisht, A. C. Gandhi, V. Kumar, **A. J. Mathew**, C. -L. Dong, C. -L. Chen, K. Asokan, S. Y. Wu, Y. Fukuma, S. Annapoorni, “Peculiar spin glass phase emerging in



FeCo/FePt driven via nanoconfined crystallographic distortions”, [Journal of Physics D: Applied Physics](#), Vol. 57, No. 46, pp. 465304 1-12 (2024).

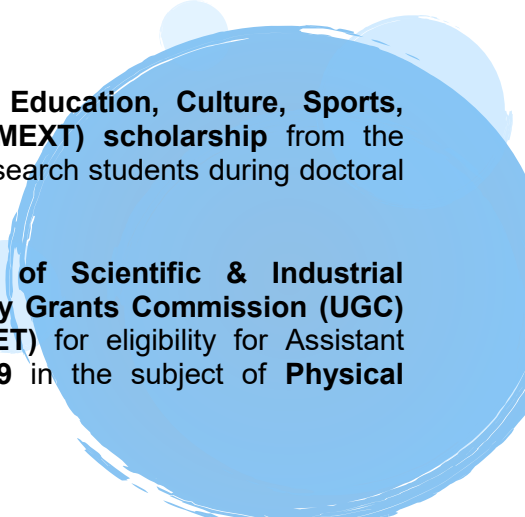
- **A. J. Mathew**, Y. Gao, J. Wang, M. Mohammadi, H. Awano, M. Takezawa, H. Asada, Y. Fukuma, “Realization of logic operations via spin–orbit torque driven perpendicular magnetization switching in a heavy metal/ferrimagnet bilayer”, [Journal of Applied Physics](#), **135** (21), pp. 213902 1-7 (2024). **(selected as Editor’s Pick)**
- U. Shashank, Y. Kusaba, J. Nakamura, **A. J. Mathew**, K. Imai, S. Senba, H. Asada, Y. Fukuma, “Charge-spin interconversion in nitrogen sputtered Pt via extrinsic spin Hall effect”, [Journal of Physics: Condensed Matter](#), Vol. 36, No. 32, pp. 325802 1-8 (2024).
- J. R. Mohan, **A. J. Mathew**, K. Nishimura, R. Feng, R. Medwal, S. Gupta, R. S. Rawat, Y. Fukuma, “Classification tasks using input driven nonlinear magnetization dynamics in spin Hall oscillator”, [Scientific Reports](#), Vol. 13, No. 1, pp. 7909 1-11 (2023).
- **A. J. Mathew**, J. R. Mohan, R. Feng, R. Medwal, S. Gupta, R. S. Rawat, Y. Fukuma, “Evaluation of memory capacity and time series prediction using a spin Hall oscillator as reservoir”, [IEEE Transactions on Magnetics](#), Vol. 59, No. 6, pp. 1300205 1-5 (2023).

• **Master’s Dissertation**

“Domain dynamics of soft ferromagnetic thin films”

under the supervision of Prof. S. Annapoorni,
Department of Physics and Astrophysics
University of Delhi, India.

Academic achievements

- Recipient of the **Ministry of Education, Culture, Sports, Science and Technology (MEXT) scholarship** from the **Japanese government** for research students during doctoral studies.
 - Qualified the joint **Council of Scientific & Industrial Research (CSIR) – University Grants Commission (UGC) National Eligibility Test (NET)** for eligibility for Assistant Professor held in **June 2019** in the subject of **Physical**
- 



Sciences.

- Recipient of the **Innovation in Science Pursuit for Inspired Research (INSPIRE) scholarship** from the Indian government for students of pure sciences during both graduation and post-graduation.

Conferences

- **A. J. Mathew**, Y. Gao, J. Wang, M. Mohammadi, H. Awano, M. Takezawa, H. Asada, Y. Fukuma, “Programmable Spin Logic based on Magnetization Switching in a Ferrimagnet via Spin Orbit Torque” in IEEE-NANO organized by the IEEE Nanotechnology Council (2024). **(Oral presentation)**
- **A. J. Mathew**, J. R. Mohan, R. Feng, Y. Nakamura, R. Medwal, S. Gupta, R. S. Rawat, Y. Fukuma, “Evaluation of spin Hall oscillator in performing reservoir computing benchmark tasks”, in the symposium on ‘*In-materio neuromorphic computing*’ organized by the Japan Society for the Promotion of Science (JSPS) Core-to-Core Program on “Material Intelligence” (2022). **(Oral presentation)**
- **A. J. Mathew**, J. R. Mohan, R. Feng, Y. Nakamura, R. Medwal, S. Gupta, R. S. Rawat, Y. Fukuma, “Evaluation of memory capacity of spin Hall oscillator for physical reservoir computing” in the 3rd *International Symposium on Neuromorphic AI Hardware* organized by the Research Center for Neuromorphic AI Hardware (2022). **(Poster presentation)**

Work Experience

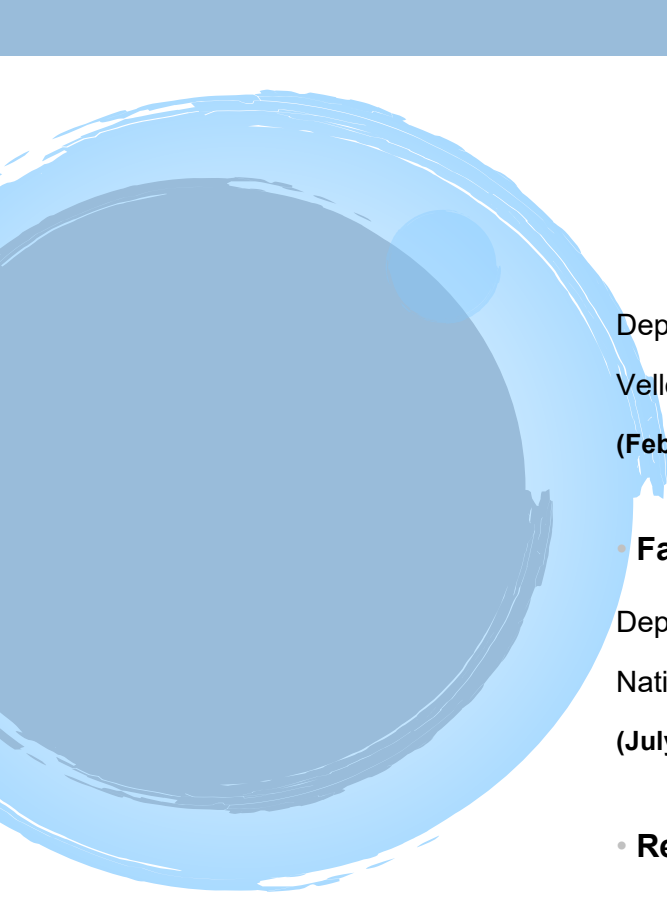
- **Assistant Professor**

Department of Physics

St. Stephen's College, University of Delhi, Delhi, India.

(May 2026 – Present)

- **Assistant Professor**



Department of Physics, School of Advanced Sciences (SAS)
Vellore Institute of Technology, Vellore, India.

(February 2026 – May 2026)

- **Faculty on Contract**

Department of Physics
National Institute of Technology Puducherry, Karaikal, India.

(July 2025 – January 2026)

- **Research Assistant**

Graduate School of Computer Science & Systems Engineering
Kyushu Institute of Technology, Japan.

(May 2024 – March 2025)

Referees

Referees to be provided upon request.

Declaration

I hereby declare that all the above information is accurate to the best of my knowledge.

– Arun Jacob Mathew.

14th July 2026.

