PhD in Bio-Inspired Neuromorphic Computing and Hardware for AI
Technische Universität Berlin (TU Berlin)

Job Title	PhD in Bio-Inspired Neuromorphic Computing and Hardware for AI
Department	Electrical Engineering and Computer Sciences (Faculty IV)
	https://www.tu.berlin/en/sam
Institution	Technische Universität Berlin (TU Berlin)
	Berlin, , Germany
Date Posted	May 9, 2025
Application Deadline	Jun. 20, 2025
Position Start Date	Dec. 1, 2025
Job Categories	Graduate Student
Academic Field(s)	Robotics
	Material/Metallurgy
	Engineering Physics
	Electrical and/or Electronics
	Computer Engineering
	Bioengineering (all Bio-related fields)
	Engineering - Other
Job Website	https://pjadaun.com/open-positions/
Apply By Email	personal@tmp.tu-berlin.de

Job Description

Are you excited about designing hardware that mimics biological intelligence with the aim to explore and understand how the brain works? Are you interested in developing hardware-based artificial intelligence (AI) with the goal of solving important societal challenges? Are you a passionate, self-motivated and creative researcher who is driven by solving important questions in neuroscience? If so,

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then the Semiconductors and Microelectronic systems (SAM) group at TU Berlin has an exciting PhD opening for you at the interface between nanoelectronic devices, computational materials science, neuroscience and AI.

We are seeking a candidate for a PhD position described as follows:

- Here, you will explore novel materials (including, magnetic, ferroelectric, 2D and correlated materials) and leverage their complex physics to design and simulate advanced nanoelectronic devices.

- These devices will replicate the finer workings of brain cells (neurons) and their connections (synapses) in the biological brain.

- Taking inspiration from neural circuits in the biological brain, e.g. the recently mapped connectome of the fruit fly, you will design nanoelectronic circuits that can mimic the connectivity and functioning of such biological networks.

- You will explore these devices and nanoelectronic circuits to glean important insights about the inner workings of the biological brain.

- This project will aim to solve important questions in neuroscience and impact applications in biomedicine, healthcare and neurotechnology.

Your tasks:

- Computationally design and simulate neuromorphic hardware including novel materials, devices and circuits. Implement bio-inspired learning algorithms on said hardware.

- Collaborate with an international, multi-disciplinary team to achieve our collective research agenda. Cooperate with machine learning and neuroscience groups on the algorithmic aspects, and with experimental groups on the fabrication aspects of the project.

- Produce high-quality publications and publicly disseminate research results through conferences.

- Contribute to the university through undergraduate teaching and mentoring.

- Serve the academic community at large through peer review, conference organization etc.

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Requirements

- Successfully completed university degree (Master, Diplom or equivalent) in Electrical Engineering, Material Science, Applied Physics, Computer Engineering, or a related field.

- Knowledge or experience in at least two of the following topics:
a) Device physics (including simulation tools such as Sentaurus or mumax etc.).
b) Basic circuit design (including tools such as SPICE or Cadence Spectre etc.).
c) Computational materials science (including tools such as Quantum ATK or VASP etc.).
d) Condensed matter physics.

- Knowledge or experience in at least one of the following topics:
a) AI algorithms and deep neural networks (including deep learning frameworks such as TensorFlow or PyTorch etc.).
b) Basic neuroscience (including knowledge of neuronal functioning and neural circuits).

- Evidence of academic excellence such as high grades in undergraduate and/or masters program.

- The ability to teach in German and/or in English is required; willingness to acquire the respective missing language skills.

Desirable:

- Programming experience in Python or R. Experience in open-source platforms such as GitHub.

- Experience in the development of neuromorphic hardware implementations.

- Background in Digital/Mixed-Signal Integrated Circuit (IC) design and Low power IC design.

- Interest in neuromorphic computing and curiosity about the workings of the brain.

- Important skills such as leadership, problem-solving, and initiative-taking.

- Creativity, an independent working style as well as the ability to work in diverse teams.

- Strong communication, interpersonal, and organizational skills.

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- Evidence of research excellence, such as high-quality publications, in related topics.

What you can expect from us:

- Participation in a young, energetic, growing, highly motivated and international team with a cordial and supportive culture.

- The opportunity to conduct parts of your project at the University of California, Berkeley and Lawrence Berkeley National Laboratory, USA.

- Benefit from close collaborations with world-renowned research groups at Fraunhofer Society, Germany, TU Delft, Netherlands, Institute of Neuroinformatics, Zurich, EPFL, Lausanne, and UC Berkeley, USA.

- Exposure to a multidisciplinary research program that spans nanoelectronic devices design, materials design, circuit development, AI algorithms and neuroscience.

- The opportunity to do a doctorate (PhD) under the supervision of experienced academics.

How to apply

Please submit the following application materials stating the **reference number** as one PDF file to the email: **personal@tmp.tu-berlin.de**.

- A cover letter in English, describing your motivation in applying for this position.

- Curriculum vitae in English, including a list of publications.

- Academic Diplomas in English or German, of your relevant degrees.

- Grade transcripts in English or German, including official description of the grading scale.

- 1 to 3 letters of recommendation, or alternatively, the contact information of 1 to 3 references who can provide said letters of recommendation.

By submitting your application via email you consent to having your data electronically processed and saved. Please note that we do not provide a guaranty for the protection of your personal data when

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submitted as unprotected file. Please find our data protection notice acc. DSGVO (General Data Protection Regulation) at the TU staff department homepage:
https://www.abt2-t.tu-berlin.de/menue/themen_a_z/datenschutzerklaerung.

To ensure equal opportunities between women and men, applications by women with the required qualifications are explicitly desired. Qualified individuals with disabilities will be favored. The TU Berlin values the diversity of its members and is committed to the goals of equal opportunities. Applications from people of all nationalities and with a migration background are very welcome.

Technische Universität Berlin - Die Präsidentin - Fakultät IV, Institut für Hochfrequenz- und Halbleiter-Systemtechnologien, FG Halbleiterbauelemente und Mikroelektroniksysteme, Prof. Dr. Jadaun, Sekr. TIB 4/2-1, Gustav-Meyer-Allee 24, 13355 Berlin

EEO/AA Policy

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Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

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