BrainChip – Internship Program 2025

Essential AI. Close to the sensor

Tony Lewis CTO Todd Vierra, VP of Customer Engagements Katie Quiroz



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A little about BrainChip

Our technology brings commonsense to the processing of sensor data, allowing efficient use for Al inferencing enabling you to do more with less. Accurately. Elegantly. Meaningfully. We call this Essential Al.

Essential is optimizing compute. Maximizing performance. Minimizing power. In the real world. And in real time.

- ✤ 15 years of AI architecture research
- Worldwide leader in edge AI on-chip processing and learning.
- First to commercialize neuromorphic IP platform and reference chip.
- Centers of engineering excellence in US, Australia, France and India.







ASX AUSTRALIAN SECURITIES EXCHANGE



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Internship Program – XX projects we are looking for Interns

- Start and End appx 3 months
- Flexible start depends on University's summer schedule (example May June 2025 start)
- End Aug/Sept
- \$28 per hour
- 25 hrs per week
- No Benefits or PTO
- Interview & Background Check Necessary
- Fast working environment
- Remote or Local
- Skillset and applicants will determine projects

Advantages – Work with State of Art HW and AI Team

May lead to full time employment

Possible AI Projects (Slides 4-12)

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Project One Vision Spatial Temporal - Ritik

Background:

Develop a vision model for object detection or segmentation using BC's proprietary TENNs State Space Model neural network.

Description:

State Space Models (SSMs) are emerging as a practical alternative to transformers, offering similar or better performance with significantly fewer parameters and lower compute requirements. Mamba, the most well-known SSM, has shown strong results across multiple domains while being highly resource efficient. Brainchip's proprietary SSM, known as TENNs, is hardware-accelerated and optimized for edge Al. This project aims to evaluate TENNs for vision tasks such as object detection and segmentation, with the goal of developing a high-performance, efficient model that can be integrated into Brainchip's model offerings.

Skills Needed:

Advanced coursework in Linear Algebra

Proficient with Python, Pytorch

Experience working with State Space Models (SSMs) and Vision Applications is a strong plus

Other: Ability to work independently and in teams. Excellent verbal, written and presentations skills.

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Project Two RTL Synthesis for Explorer - Dhvani

Objectives:

- 1. Automate identification of the optimal simulation window in VCS for accurate SAIF extraction..
- 2. Integrate automated SAIF generation into the RTL power analysis flow using Design Compiler.
- 3. Automate the power analysis flow for Akida supported models

Description:

The purpose of this project is to build a script-driven automation flow that pinpoints the most meaningful simulation window in Synopsys VCS and extracts switching activity (SAIF) for various Akida supported models. The output will directly feed into Design Compiler for RTL power estimation to evaluate power across hardware IPs. This is a chance to work hands-on with industry-standard tools and contribute to a real-world RTL-to-GDS flow that powers cutting-edge silicon.

Team size: 1

Skills Needed:

- Tcl, Python or Csh script programming.
- Familiar with EXCEL functions and their usage.
- Good analytic skill
- Basic understanding of semiconductor design flow is a plus.







Project Three – Model Compilation - Kurt

Objective:

This project focuses on evaluating Apache TVM and OpenXLA as ML compilers for deploying two Akida TENNs models (a Large Language Model and a Keyword Spotting Model) across x86 and ARM processors. The intern will design optimized workflows for both frameworks, analyze performance metrics, and document best practices for deployment.

Description:

- Set up development environments for TVM (using Hugging Face integration) and XLA (via PyTorch/XLA).
- * Export both PyTorch models to ONNX or TorchScript for cross-framework compatibility.
- * Implement TVM and OpenXLA compilation pipelines for both models.
- * Optimize using auto-scheduling and quantization tools.
- Generate binaries for x86 and ARM targets (e.g., Raspberry Pi).
- * Test on multiple devices and compare metrics: Inference Latency, Memory Usage, Cross-Platform Consistency
- * Create reproducible scripts for both workflows.
- * Draft a performance analysis report with recommendations.

Team size: 1

Skills Needed :

- Proficiency in Python and PyTorch.
- Familiarity with ML compilers (TVM, XLA, or TensorRT).
- * Experience benchmarking ML models on CPUs.







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Project Five – Development of a Cloud-Based Web Application for Akida Model Compatibility Analysis - Kurt

Objective:

The goal of this internship is to transform a Python command line script into a user-friendly, web-based application. This application will analyze ONNX machine learning models to identify compatibility with Akida framework layers, offering a visual representation and further extending its accessibility and functionality through cloud migration.

Description:

- Develop a web-based front-end interface for an existing Python command line script that evaluates ONNX machine learning models for Akida compatibility.
- Migrate the newly developed web application to a cloud service to enhance accessibility for authorized users.
- * Collaborate with the software team to integrate lookup logic for determining layer compatibility with Akida.
- * Enhance the application by adding features such as providing detailed instructions for modifying incompatible model layers.
- * Work to ensure the application is secure, scalable, and maintains performance efficiency both locally and in a cloud environment.
- * Document the development process and create user guides to assist future developers and users in navigating the application.

Team size: 1

Skills Needed :

- * Proficiency in Python and web development technologies such as HTML, CSS, and JavaScript.
- * Experience with cloud services (e.g., AWS, Azure, Google Cloud) and deploying web applications.
- Understanding of machine learning model formats, especially ONNX, and familiarity with neural network frameworks.
- * Strong problem-solving skills and ability to work collaboratively with a software development team.



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Project 6– Advanced Edge model development

Objective:

Develop, create train and quantized a comprehensive AI model for Akida hardware using 2D images and 1 D convolutions that are optimized on BrainChip's Akida IP. This will increase our model zoo library with Advance AI techniques on the edge based inference

Description Types:

- ¥ Vision models for object detection
- Segmentation models
- * 1D time series models for EEG or other healthcare use cases
- ID time series for anomaly detection

Team size: 4-5

Skills Needed :

- * Strong organizational and documentation skills.
- Familiarity with various programming languages (e.g., Python, C++, Java) and development environments.
- * Experience with training edge based models for efficient and constrained edge use cases.
- Knowledge of State space recurrent models a plus.
- * Understanding of software development processes and version control (Git and GitHub).
- Knowledge of hardware setup, configuration, and troubleshooting.







Project 7 Project Management (2 positions)

CTO and Engineering WBS, project control and risk mitigation

Objectives:

Application of project management skills to lead and manage the budget, risk and meet desired timelines for CTO and Engineering projects.

Description: This role will involve overseeing the integration of innovative technologies into business processes, managing timelines, and ensuring the delivery of high-quality solutions within scope, budget, and schedule.

- Lead and manage cross-functional Agile teams in the development and delivery of solutions.
- Organize and facilitate sprint planning, stand-ups, retrospectives, and backlog management to ensure continuous program delivery and improvement.

Skills Needed:

A strong understanding of both the technical and business aspects of hardware and software programs, preferably utilizing Agile and Scrum methodologies.

Strong analytical, communication and planning skills.

Academic requirements:

Project management and budgeting/business coursework.

3.5 GPA in a stem field (e.g. Math, Engineering, CS) or other evidence of ability.

Other: Ability to work independently and in teams. Excellent verbal, written and presentations skills.



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Project 8 Neuromorphic Compute in the Cloud

Leverage cloud FPGAs for large scale event based computation

Objectives:

To design and implement a large scale neuromorphic event-based network on a cloud FPGA infrastructure

Description: BrainChip currently has multiple neuromorphic architectures which run on local FPGAs. This limits the size and location of networks for testing and demonstration. In this project, we would take one architecture and scale it up to very large size, and run it on cloud FPGAs from Amazon or Intel.

Skills Needed:

General CS or EE skills. Linux, Verilog, scripting all helpful but can be learned on the task. Git or similar experience will be helpful.

Other: Ability to work independently and in teams. Excellent verbal, written and presentations skills.





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Project 9 Methods of Parallel Inferencing in Neuromorphic Systems

New paradigms in Neural Network Computation

Objectives:

To demonstrate the use of parallel inferencing in a neuromorphic architecture

Description: The use of parallel processing in Machine Learning training is well established and essential for efficient use of compute resources. Parallel inferencing is still in its infancy, and the inefficiency of inference is a huge cost driver for companies like OpenAI. In this project we will pursue one or perhaps two methods of parallel inferencing in BrainChip networks and systems.

Skills Needed:

Working knowledge of at least one of : PyTorch, Numpy, Keras or other deep learning framework.

Highly skilled in Python.

Academic requirements:

Advanced coursework in Linear Algebra

 $3.5~\mbox{GPA}$ in a stem field (e.g. Math, Engineering, CS) or other evidence of ability.

Other: Ability to work independently and in teams. Excellent verbal, written and presentations skills.





Project 10– Research

CTO TEAM

Objective:

- * Analyze theoretical advantages of State-Space Models
- Description Types:
- * State-Space Models may be the ideal LLM engine for extreme low power applications. Here we will develop the scientific backing by reviewing SSM papers and Transformer paper and synthesizing a view. Will result in a publication
- Flow Machine: Develop the theoretical basis for a new view of neuromorphic machines based on markovian systems (SSM) versus a focus on spike based behavior. This will result in a publication.

Team size: 1-2

Skills Needed :

- * Strong organizational and documentation skills.
- * Ability to read and critically evaluate the latest research in transformers, State-Space Machines and Neuormorphic engineering
- * Experience writing papers for high impact journals and conference a plus or stong desire to learn.
- Knowledge of State space recurrent models a plus.
- Excellent written and verbal skills



If you are interested or any questions email.

Contacts: Katie Quiroz

Tony Lewis

Todd Vierra

interns2025@brainchip.com

Please send your resume and cover letter with the specific projects you are interested in and with your relevant experience related to the project. Label first and second priority.











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