

APRIL

AI Hub for Productive Research
& Innovation in Electronics

Everything you need to know about
the APRIL AI Hub

March 2026



The **APRIL AI Hub** was launched on 1st February 2024; you can watch our Online Launch session via our QR code. We are one of nine UKRI EPSRC funded AI Hubs across the UK and our research and developments are focused on AI for the electronics supply chain.

Foreword

Prof. Themis Prodromakis Hub Director

Artificial Intelligence (AI) is transforming the very foundations of science and engineering, from the way we discover new materials to how we design and manufacture emerging technologies. The UK stands at a critical moment in this transformation, with the opportunity to lead globally in developing responsible, and trustworthy AI capabilities for the critical sector of electronics.



At APRIL, our mission is to accelerate this shift. We are creating the tools, methods and frameworks that allow engineers to embed AI into real world systems, bridging fundamental research with industrial applications. From novel semiconductors and advanced materials to sustainable manufacturing, our work enables faster innovation, greater efficiency and reduced environmental impact across the whole electronics supply chain.

What makes APRIL unique is our collaborative approach. By connecting leading academic centres with industry partners and national facilities, we ensure that advances in AI are both cutting edge and commercially meaningful. We are also deeply committed to training the next generation of engineers and researchers who will shape this future, not just as users of AI but as its designers and custodians.

As we continue to expand our partnerships and capabilities, APRIL is helping define how AI can responsibly transform the UK's research and innovation landscape, delivering tangible benefits for society, industry and the economy.

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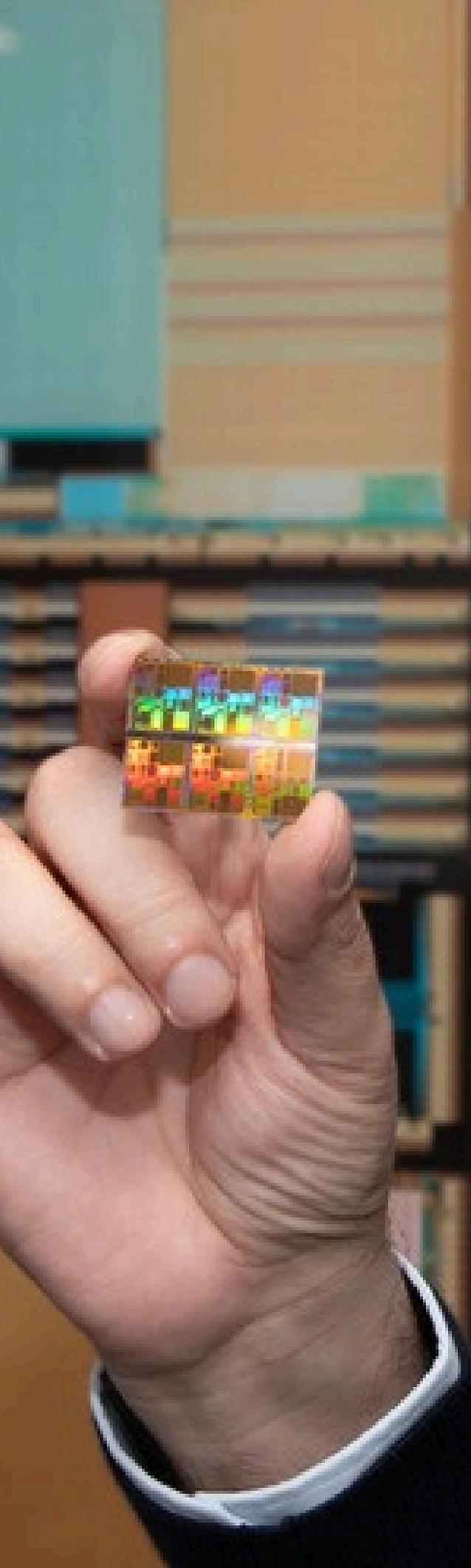
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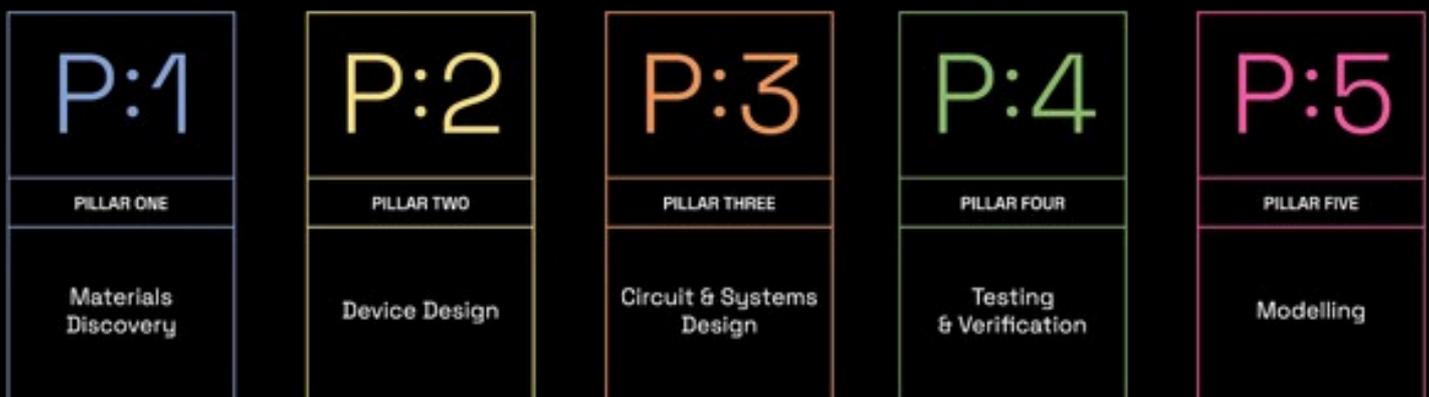
APRIL Mission

The AI for Productive Research and Innovation in eElectronics (APRIL) Hub is a UK Centre of Excellence that leverages AI to drive productivity, innovation, and competitiveness in the semiconductors and electronics industries with cutting-edge AI.

At APRIL, we embed advanced AI into every stage of the electronics supply chain, accelerating materials discovery, streamlining integrated circuit design, and enhancing verification and modelling.

Our mission is to connect world-class academic research with real industry needs for faster development of new materials and devices, reduced manufacturing costs and environmental impact, and smarter, more secure, and efficient electronic systems, empowering the next generation of engineers and researchers to lead in the digital era.

By fostering collaboration, we empower industry, academia, and policy makers to accelerate innovation and shape future technology.

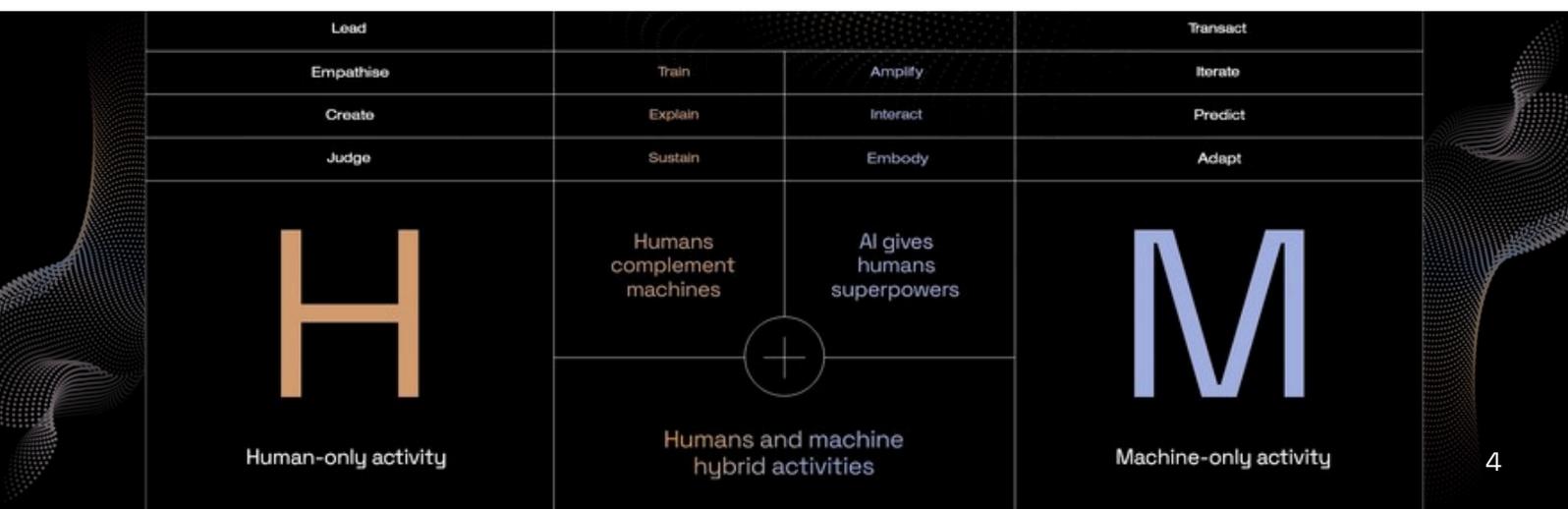




Combining our creativity and judgement, with the efficiency and predictive ability of AI, the APRIL AI Hub aims to create ground-breaking technology to support engineers, industry professionals, and end users throughout the electronics supply chain. We proactively address key industry challenges by coordinating research and delivering targeted solutions, through our network. We also provide actionable insights and practical tools that drive tangible results for our partners.

Equality, Diversity and Inclusion are integral to everything we do. We promote flexible, transparent, and inclusive practices that enable every individual to reach their potential. Our research is founded on principles of trust and accountability, ensuring that advances in AI and electronics are developed ethically and deliver real benefits to society.

We protect intellectual property and uphold research integrity, while embedding Responsible Research and Innovation through continuous engagement and training. Environmental sustainability is a cornerstone of our long-term strategy, with all activities aligned to national and institutional commitments for reducing environmental impact.



Hub Structure

Pillars

The APRIL AI Hub’s research is formed into five pillars: Materials Discovery, Device Design, Circuit & Systems Design, Testing & Verification, and Modelling. Each pillar is led by two Pillar Leads, one specialising in the computer science or AI element of the pillar, and the other in the electronic engineering side. The Pillar Leads advise and support our team of researchers who each have a primary pillar, but many also work across other pillars.

Core Capabilities

The vertical pillars structure of APRIL is complemented by a horizontal structure of fundamental, cross-cutting capabilities that underpin the Hub’s ability to deliver each pillar. Most of our Hub tasks draw upon these: Data Collection, AI Model Selection, AI Model Training, System Integration, and Data Security.

Cross-Pillar Collaboration

At APRIL AI Hub, cross-pillar collaboration is at the heart of our innovation model. Many of our researchers work across multiple

pillars creating opportunities to integrate diverse technologies, expertise, and capabilities. This collaborative approach fosters a cohesive development pathway for advanced solutions in the electronics supply chain. By initiating joint projects with shared goals and leveraging collaborative platforms for real-time data and model sharing, we enable seamless knowledge exchange and multidisciplinary problem-solving. Our regular brainstorming sessions further spark innovation, ensuring ideas flow freely between teams and disciplines.

Name	Pillar	Materials Discovery	Device Design	Circuit & Systems Design	Testing & Verification	Modelling
Alex		●				●
Atish		●	●	●		●
Ben		●	●			
Shashank		●	●			●
Chandrabhan			●	●		
Ali				●		
Cristian				●	●	
Yijia			●	●		
Panagiota				●	●	
Ramesh					●	
Pratibha				●		●

Independent Advisory Board Members

Mr. Ian Donald

IAB Chair, & Ex-Head of Research & Development
Siemens GMC, Congleton



Dr. Feras Alkhail

VP Research and Development
Pragmatic Semiconductor



Prof. Sarvapali Ramchurn FIET

Professor of Artificial Intelligence
University of Southampton



Mr. Jed Hurwitz

Fellow
Analog Devices



Prof. Dimitra Simeonidou, FREng, FIEEE

Professor of High Performance Networks
University of Bristol



Ms. Priya Guha, MBE

Non-Executive Director
UK Research & Innovation & Herald Investment Trust



Prof. Emeritus Steve Furber

Professor Emeritus
University of Manchester



Mr. Bruce Rae

End-to-End Product Development Manager
STMicroelectronics



Dr. Alexandra Smyth

Head of Policy for Infrastructure and Resilience
Royal Academy of Engineering



Prof. Mark Girolami

Chief Scientist
The Alan Turing Institute



Our Team

Prof. Themis Prodromakis Hub Director

Themis holds the Regius Chair of Engineering at the University of Edinburgh and is Head of Research Institute for Institute for Integrated Micro and Nano Systems. His work focuses on developing metal-oxide Resistive Random Access Memory technologies and related applications. He holds a Royal Academy of Engineering Chair in Emerging Technologies and a Royal Society Industry Fellowship.



Prof. Dame Wendy Hall, DBE, FRS, FREng Hub Co-Director

Wendy is Regius Professor of Computer Science, Associate Vice President (International Engagement) and Director of the Web Science Institute at the University of Southampton. She was Dean of the Faculty of Physical Science and Engineering from 2010 to 2014 and Head of the School of Electronics and Computer Science from 2002 to 2007.



Dr. Anastasia Eleftheriou Hub Manager

Anastasia brings expertise across research, academia, entrepreneurship, and management in the field of Computer Science. She holds a PhD in Complex Systems Simulation from the University of Southampton and a BEng in Computing from Imperial College London. She is the founder of Technologos, leading European initiatives in digital education, AI, and social innovation.



Aisyah Noor Mohd Hub Administrator

Aisyah has vast experience in project management, partnerships, public engagement and community outreach. She has held various roles from providing support and guidance to Centres for Doctoral Training programmes to organising festivals and programmes for national museums and heritage institutions. Currently, she provides professional services support to ensure the smooth delivery of the Hub's objectives.





Dr. Caterina Netti

Business Development Executive

Following Caterina's PhD in Physics, she joined the University of Southampton, diving into research and entrepreneurship in optoelectronics and life sciences. With over 20 years of experience, she has co-founded a company and utilised her scientific expertise to transition technologies from R&D to global markets, securing regulatory approvals and launching successful products.

Caterina has held various roles, from Chief Scientific Officer to Head of Commercial, in spin-offs, SMEs, and large corporations. Her responsibilities have encompassed research, product development, and strategic market positioning. She excels in leading cross-functional teams and building strong stakeholder relationships to achieve targets and drive revenue.



Megan Hammell

Engagement Officer

Megan is responsible for event planning, website and social media management, and the Hub's overall engagement strategy. She is also a photographer, and creates a variety of engaging content and materials for the Hub, working to publicise and promote the valuable work and impact the Hub produces.

Megan has worked in communications and events planning in the charity and education sectors for over seven years. She has a BA (Joint Hons) Chinese and Film Studies from the University of Hull, and MA Film from Screen Academy Scotland.



Molly Smith

Outreach and Impact Officer

Molly is responsible for bringing together the Hub community through organising and delivering a variety of outreach events. Her mission is to engage APRIL with new generations of AI users and diverse sets of groups, specifically elderly and youth groups.

Molly has experience of working in outreach in Higher Education and organising and delivering events for widening participation groups since 2021. She holds a BA in History and International Politics from the University of Leeds and is currently working towards her MSc in Social Research at the University of Edinburgh. She is passionate about inclusion, widening participation and representation - values that influence her outreach work at APRIL.

Pillar One: Materials Discovery



Prof. Jacqueline Cole **University of Cambridge**

Jacqueline is the Royal Academy of Engineering Professor of Materials Physics, University of Cambridge.

She combines AI with data science, computational methods and experimental research to afford a 'design-to-device' pipeline for data-driven materials discovery. Her research is highly interdisciplinary. Accordingly, she holds two PhDs.

Before moving to Cambridge, Jacqueline held a post-doctoral position in Physics at the University of Kent at Canterbury, UK. Prior to this, she undertook a PhD in Chemistry through an international studentship between the Institut Laue Langevin, Grenoble, France, and Durham University. Her university studies began at Durham University where she graduated with first class honours in Chemistry in 1994.



Prof. Subramanian Ramamoorthy **University of Edinburgh**

Subramanian is Professor of Robot Learning and Autonomy in the School of Informatics at the University of Edinburgh, where he is the Director of the Centre for AI in Assistive Autonomy and the Generative AI Laboratory.

His research explores machine learning and its uses in robotics and autonomous systems. This includes physics informed machine learning and the problem of trustworthiness in AI. This work has attracted funding from a variety of sources including UKRI, EU, DARPA, DSTL and the Royal Academy of Engineering, and been recognised with best paper awards at international conferences including ICRA, IROS, CoRL, ICDL and EACL.

Pillar Two: Device Design

Prof. Merlyne De Souza University of Sheffield

Merlyne has been Chair in Microelectronics at the University of Sheffield since 2007. Her research spans multidisciplinary areas, focusing on energy-efficient, CMOS-compatible devices for edge intelligence and brain-machine interfacing. She previously led the €4.9M ENIAC JU project Partitioning and Modelling Systems in Package (PARSIMO) (2011–2014) and was a core member of Energy to Smart Grid (E2SG) (2012–2015), which received the EU-ECSEL Innovation Award in 2015. She was the first person to win an Student Research Competition award internationally in open competition with US universities in 2003.

Merlyne currently serves as a Distinguished Lecturer and Vice President for Emerging Technologies of the IEEE Electron Devices Society (EDS). She is a member of the Nanoelec Scientific Council (France) since 2017, and a Mercator Fellow of the DFG Collaborative Research Center Next Generation Electronics with Active Devices in Three Dimensions (since 2025).

Merlyne earned her PhD from the University of Cambridge in 1994. Prior to joining the University of Sheffield, she became Professor of Electronics and Materials at De Montfort University in 2003.

Dr. Kai Xu King's College London

Kai is an expert in ultra-low-power CMOS integrated circuits (IC) and systems for wireless communication and AI/ML. He leads the Analog Intelligent Circuits and Systems Lab at King's College London.

Kai is an Assistant Professor of Electronics Design in the Department of Engineering, King's College London. His research interests span analog and mixed-signal design, AI-assisted wireless circuits and systems, and energy-efficient AI accelerators for edge computing. He has co-authored over 35 papers in peer-reviewed IEEE journals and conferences.



Pillar Three: Circuits & Systems Design

Prof. Christos Bouganis Imperial College London

Christos is Professor of Intelligent Digital Systems in the Department of Electrical and Electronic Engineering, Imperial College London.

Christos is an expert in reconfigurable computing and design automation mainly targeting digital signal processing algorithms. He leads the Intelligent Digital Systems Lab (iDSL) group at Imperial College, with a focus on the theory and practice of reconfigurable computing and design automation, concentrating on the domains of Machine Learning, Computer Vision, and Robotics.



Prof. Michael O'Boyle University of Edinburgh

Michael is Professor of Computing and Director of the Institute for Computing Systems Architecture at the University of Edinburgh's School of Informatics. Michael's research interests include adaptive compilation, machine learning based optimisation, auto-parallelising compilers and heterogeneous GPGPU multi-core platforms. He is project leader of the MILEPOST GCC project and founding member of the European Network of Excellence on High Performance and Embedded Architecture and Compilation.

An expert on the automatic exploitation of heterogeneous hardware using neural embeddings, program synthesis and neural machine translation, Michael holds an EPSRC Established Career Fellowship.



Pillar Four: Testing & Verification

Dr. Danial Chitnis University of Edinburgh

Danial is an academic at the School of Engineering at the University of Edinburgh. His research focuses on developing new tools and paradigms of AI-assisted design and test automation for Electronics Engineering. He is the lead on the project "LABIIUM" sponsored by Keysight Technologies, which aims to use machine learning and large language models to automate electronic test and measurement, including orchestration of multi-instrument setups.

Additionally, he led "EEsizer", an LLM-based AI agent for sizing of analogue and mixed-signal circuits. This system includes automatic sizing of a three-stage rail-to-rail opamp. In "EEschematic", a Multimodal-LLM-based AI agent generates schematics for an analogue circuit. Such a system is an essential part of human-in-loop verification for future agentic electronic design and automation tools. Danial is now developing new tools and systems for agentic integrated circuit design in both analogue and digital domains.

Prof. Kerstin Eder University of Bristol

An expert in design verification, Kerstin is the Head of the Trustworthy Systems Laboratory at the University of Bristol. She received an RAEng "Excellence in Engineering" Prize.

Kerstin has a strong background in computational logic, especially formal verification, declarative programming, abstract machines, compilation techniques and meta programming.

Kerstin's research activities are focused on specification, verification and analysis techniques which allow designers to define a design and to verify/explore its behaviour in terms of functional correctness, performance, power consumption and energy efficiency. Her work includes both formal methods and state-of-the-art simulation/test-based approaches.



Pillar Five: Modelling

Prof. Vihar Georgiev University of Glasgow

Vihar is Professor of Nanoelectronics and leader of the DeepNano Group at the University of Glasgow. He has more than 15 years of experience in developing numerical solvers and machine learning methods that are used for modelling and simulations of various nanoscale devices for advanced optoelectronics, biosensors and quantum applications.

Vihar holds an EPSRC UKRI Innovation Fellowship and serves as a Visiting Professor at TU Vienna. Since his appointment as a Lecturer in 2015, he has secured funding of around £2M as a PI and around £5M as a co-PI. Apart from his academic achievements Vihar was a Quantum Simulation and Business Development Adviser at SemiWise and VP Business Development and Quantum technology at Advanced Microelectronics Associates. Currently he is a Chair of the Industry Advisory Board and deputy head of the Electronic and Nanoscale Division at the University of Glasgow.

Prof. Rishad Shafik Newcastle University

Rishad is Personal Chair in Microelectronic Systems Design within the Microsystems Research Group and serves as the Director of the Microsystems AI Lab at Newcastle University. He is also a Co-founder of Literal Labs.

Rishad's research emphasises hardware/software co-design of machine learning systems, with a particular focus on ultra-low-power design using Tsetlin Machines. His research contributed to circa £42m research grants as PI/Co-I funded by EPSRC, Research Council of Norway (RCN), European Research Council (ERC) and Industries.

Rishad co-edited the reference book: "Energy-efficient Fault-Tolerant Systems" published by Springer USA, and has authored/co-authored over 200 research articles. He is a Member of the IET, a Senior Member of IEEE, a Steering Member of the EPSRC-funded eFutures, and a regular contributor to, and organiser of, major conferences. He received his PhD and MSc (with distinction) degrees from the University of Southampton in 2010 and 2005 respectively.



Advisors

Prof. Máire O'Neill Queen's University Belfast

Máire is Regius Professor in Electronics and Computer Engineering, and Director of the Centre for Secure Information Technologies (CSIT) at Queens University Belfast. She is also Director of the UK Research Institute in Secure Hardware and Embedded Systems (RISE) and serves on the leadership team of the Responsible AI UK programme.

Máire is internationally recognised for her research in hardware security and applied cryptography. She has received numerous awards which include a 2024 Royal Irish Academy Gold Medal, a Blavatnik Engineering and Physical Sciences medal, 2019, and a Royal Academy of Engineering Silver Medal, 2014. She is a Fellow of the Royal Academy of Engineering, a member of the Royal Irish Academy and Fellow of the Irish Academy of Engineering.



Prof. Bipin Rajendran Northeastern University London

Bipin is Professor of Intelligent Computing Systems in the Institute for Intelligent Networked Systems at Northeastern University London. His research focuses on hardware–software co-design, novel devices and architectures, and neuromorphic algorithms for next-generation AI infrastructure and networked intelligence.

He received a B. Tech degree from I.I.T. Kharagpur in 2000, and MS and PhD degrees in Electrical Engineering from Stanford University in 2003 and 2006, respectively. He was a Master Inventor and Research Staff Member at IBM T. J. Watson Research Center in New York during 2006–2012 and has held faculty positions in India and the US.



Researchers

Dr. Atish Dixit Research Fellow

Atish's research combines machine learning, applied mathematics, and computational simulations to explore innovative ways of designing and optimising engineering designs. He has focused on building generative AI to solve engineering problems in the areas of petroleum engineering and multi-agent robotic systems. Atish aims to develop AI-driven frameworks that improve efficiency and uncover new possibilities for material innovation.



Dr. Alexandros Keros Research Fellow

Alexandros works on exploring the interplay of structure and function by employing topology, geometry, and machine learning methods to discover novel materials for electron devices. Achieving this entails understanding complex dynamical systems, efficiently producing accurate physical models and simulations, and concisely modelling the resulting structures.



Dr. Ben Rowlinson Research Fellow

Ben's research focuses on exploring new, non-silicon-based materials for electronic devices and circuits. Across the periodic table, there are millions of combinations of elements that could offer improved characteristics, lower environmental impact or properties yet to be discovered. Ben's dual experimental and computational approach leverages machine learning techniques on real, measured data.



Dr. Cristian Sestito Research Fellow

Cristian's research sits at the intersection of AI for circuits and systems design automation and circuits and systems design for AI. On the one hand, he builds Large Language Model (LLM)-powered tools to accelerate commercial Electronic Design Automation (EDA) workflows. On the other hand, he designs energy-efficient AI accelerators—especially systolic arrays that cut data-movement energy via local reuse.



Researchers

Dr. Zarak Bhat Research Associate

Zarak works at the intersection of artificial intelligence and semiconductor device engineering. She combines physics-based device insight with advanced computational modeling to design AI-driven frameworks that extract critical features from large-scale simulation and experimental data, enabling the prediction of optimal device configurations and improved yield. Zarak's work advances data-driven methodologies for faster, more sustainable, and power-efficient electronic technologies.



Dr. Yijia Hao Research Associate

Yijia holds a PhD from the University of Glasgow, where her research focused on applying AI to automate and optimise analog and mixed-signal integrated circuit design, specifically through novel surrogate model-assisted sizing algorithms. She also holds a BSc in Electronic Engineering from the University of Electronic Science and Technology of China (UESTC).



Dr. Panagiota Kontou Research Associate

Panagiota's research centres on circuit design and verification automation using commercial Electronic Design Automation (EDA) tools, with a particular emphasis on radio frequency (RF) design. Currently, she explores circuit representation in a netlist format and investigates how AI can repair and optimise these designs. With prior experience in developing real-world healthcare solutions and hands-on expertise in circuit design and testing, Panagiota is driven to create efficient and intelligent automation tools.



Dr. Ramesh Krishnamurthy Research Associate

Ramesh studies how AI can enhance verification workflows by modelling system behaviour, guiding test selection, and detecting corner-case conditions early. His broader goal is to create adaptive, data-guided verification pipelines that reduce engineering effort and enhance trust in next-generation electronic designs. By blending learning techniques with principled analysis, Ramesh develops methods that accelerate verification for digital, RF, and novel device technologies, with the goal of improving test quality and reducing manual effort.



Researchers

Dr. Chandrabhan Kushwah Research Associate

Chandrabhan is researching AI Electron device design to identify key features of components or devices by analysing large datasets from simulations, experiments, or historical data. Machine learning models can extract patterns that characterise the devices, such as performance metrics, material properties, and design features. These characteristics can then be compared across different devices to identify similarities and differences, which helps in decision-making, optimisation, and benchmarking.

Dr. Shashank Mishra Research Associate

Shashank's research focuses on leveraging AI models along with other physics-based models to predict materials and their interfacial properties for optimal device performance. His current interest lies in exploring AI tools to predict performance of energy harvesters such as triboelectric nanogenerators. Shashank's work aims to explore the materials space and develop inverse design approaches to accelerate the device design process.

Dr. Alin Panca Research Associate

Alin develops and fabricates thin-film transistors for AI hardware, with a focus on integrating memory devices directly with transistors into architectures that enable in-memory computing. By combining data storage and computation within the same structures, this approach has the potential to significantly accelerate processing while reducing energy consumption. His work also explores translating these device architectures onto flexible substrates, expanding the possibilities for integrating advanced computing capabilities into a wider range of electronic platforms.

Dr. Ali Siddique Research Associate

Ali's work uses AI to estimate hardware resources such as area and energy, supporting automated pipelines. Furthermore, as researchers explore LLMs for RTL code generation, his methods can take generated RTL and rapidly predict implementation costs. He also builds lightweight models for neuromorphic hardware, specialising in spiking neural networks. In addition, he explores metaheuristics such as Grey Wolf Optimisation to accelerate design space exploration.



Researchers & Engineers

Dr. Pratibha Verma Research Associate

Pratibha works at the intersection of AI and hardware design, focusing on AI-driven automation for analog and mixed-signal circuits. Her work aims to integrate intelligent design methodologies into traditional electronic design workflows, bridging AI and hardware design to shape the next generation of intelligent electronic systems.



Dr. Kaiyuan Yang Research Associate

Kaiyuan's research explores how artificial intelligence can transform semiconductor design workflows, particularly in AI-driven Electronic Design Automation, system-level modelling, and accelerator architecture exploration. He introduced the concept of Natural-Level Synthesis (NLS), a design stage that translates high-level design intent expressed in natural language into synthesisable hardware descriptions, bridging system specification and RTL implementation.



Dr. Rain (YuQin) Zhao Research Associate

Rain's research focuses on AI for verification and testing automation at the University of Edinburgh. He works on integrating artificial intelligence into electronic design automation (EDA) workflows for design, verification, and testing, alongside broader interests in hardware-accelerated SoC design and next-generation EDA tool development.



Dr. Ahmet Cirakoglu EDA / CAD Support Engineer

Ahmet completed his PhD at the University of Edinburgh's Institute for Integrated Micro and Nano Systems. His research focused on exploiting the inherent radiation hardness and in-memory computing capabilities of resistive random-access memories (RRAMs) to develop energy-efficient AI hardware accelerators for space applications. Prior to his doctoral studies, Ahmet worked as an RFIC design engineer at Phasor Solutions (now Hanwha Phasor) from 2017 to 2020.



PhD Students

Lai Gan

An AI-Driven Autonomous Experimental Platform for Closed-Loop Discovery of Emerging Devices

Lai has recently graduated with an MEng in Electronics & Electrical Engineering from the University of Edinburgh, where his postgraduate studies focused on signal processing, data analysis, AI technique application, and software/hardware programming. He aims to integrate AI-driven, automated EDA workflows into day-to-day experimental practice, linking instrument control, long-term data capture, database-backed storage, quality checks, modelling, and closed-loop orchestration into a simple, reproducible pipeline.



Shu Gu

Multi-Nodal Circuit Models for AI-Assisted EDA and Verification

Shu is researching automatic circuit design and optimisation tools, focusing on improving efficiency across the design flow. His work aims to integrate diverse tools—spanning analog, digital, and transistor-level design—into a unified and automated workflow. Using large-language-model (LLM) agents to coordinate this process, Shu seeks to enable smarter human-AI co-design and reduce time and cost in electronic design automation.



Eva Hita Sogorb

AI-Assisted Design Techniques for Power-Constrained Medical Applications

Eva's research combines artificial intelligence methods and electronics research to develop graph-based neural networks that optimise electronic circuits for low-power biomedical applications. She earned a BEng in Biomedical Engineering from University College London (2025), completing her dissertation in the use of machine learning models to predict how tau proteins spread through the brain in Alzheimer's disease from cognitive biomarker data. She was also a Google DeepMind Research Ready Intern at the APRIL AI Hub in summer 2025.

Her research interests include graph-based neural networks, AI-driven circuit design for biomedical devices, and the translation of advanced electronics and machine-learning methods into healthcare diagnostics and therapeutics.



PhD Students

Eleni Tselepi

Efficient Hardware Acceleration of Generative AI models for Image Applications on Edge Devices

Eleni recently graduated with an MEng in Electrical and Computer Engineering from the University of Thessaly, Greece. During her studies, she gained experience across multiple domains, including FPGA design, embedded systems, and VLSI. As a member of the Electronics Research Lab at the University of Thessaly, she explored ICs aging and long-term reliability issues with a focus on electromigration and thermomigration. During her thesis work she also explored generative AI, and specifically convolutional single-shot Generative Adversarial Networks (GANs). As a PhD researcher, Eleni will focusing on developing energy-efficient hardware architectures for convolutional GANs within FPGA and ASIC design.



Semih Vazgecen

In-Silicon Edge Image Processing with GANs

As part of Semih's Master's project, which won the Ewart Farvis Project Prize for the best MEng student project with most industrial relevance, he developed a facial recognition software application that specifically targets aerially captured non-frontal images, leveraging Generative Adversarial Networks (GANs) and an energy-efficient neuromorphic hardware framework.

At the APRIL AI Hub, Semih's doctoral research explores the practical deployment of advanced large-scale AI models on energy-aware systems, aiming to bridge the gap between cutting-edge algorithms and sustainable real-world applications.



Matthew Youngman

A Feedback-Driven LLM Framework for Efficient Hardware Design

Matthew holds an MEng in General Engineering, specialising in electronics, and is now pursuing his PhD. His background spans FPGA-based digital design, machine vision research, and professional experience as a software and embedded systems engineer - combining academic rigour with practical industry insight.

His research focuses on harnessing large language models to transform electronic design automation, accelerating the development of specialised FPGA-based systems and advancing the wider semiconductor design landscape.



Research

Pillar One

Materials discovery is key for the development of next-generation electron devices. We pioneer tools to advance material science for electronics engineering. From Electronic Materials Operating System (EMOS), the one-stop-platform that curates material databases, generators, and predictors for crafting custom material discovery pipelines, to topological methods for characterising atomic structure and material behaviour, we develop novel data-driven methods to investigate material properties and structures. Our cutting-edge AI models, from the gradient-boosted electronic property predictors to the property conditioned synthesis-aware generative solutions, provide efficient ways to predict future-defining materials.

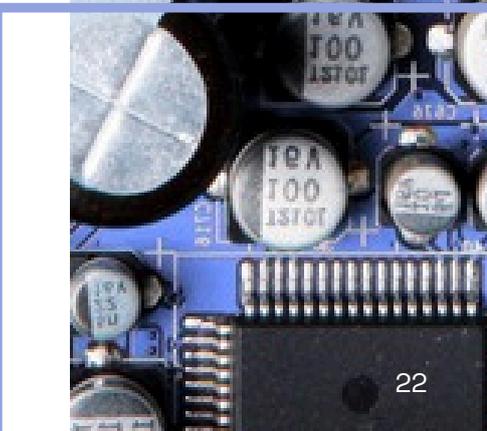
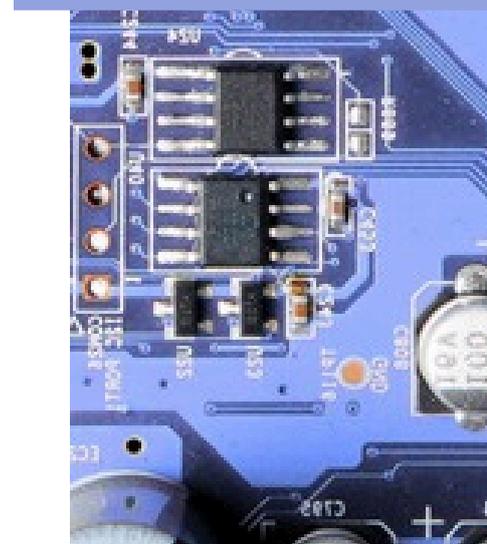
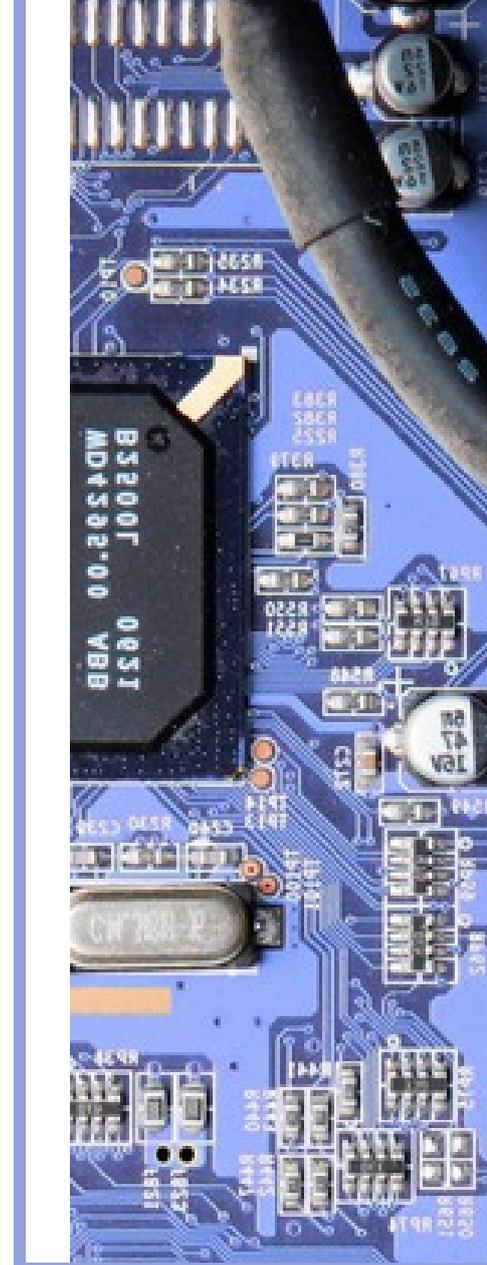
Pillar Two

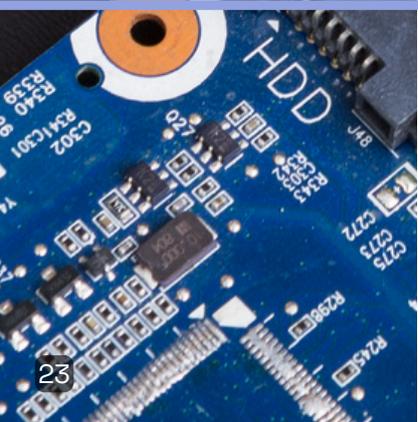
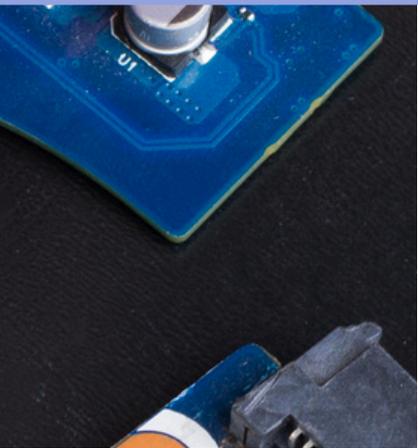
Device Design aims to build AI driven systems that design and execute experiments to discover optimal device recipes and manufacturing parameters for high yield, high performance electron devices. We have been developing a modular, cloud ready pipeline that automatically curates experimental device data from the literature; combining open source tools, OCR, rule based and LLM assisted parsing, unit normalisation, semantic filtering, and a custom scholarly search engine to scale trustworthy datasets for benchmarking and design. In parallel, we are exploring ML approaches that learn latent features from literature extracted simulation and experimental data to predict key metrics and enable inverse design, reducing trial and error. Ongoing efforts span TCAD calibration, physics informed optimal control, and LLM based verification. The Semiconductor Traceability and AI-assisted Research System (STARS) is a provenance-first, AI-ready platform for automated workflows across emerging electronic devices, such as memristors, TFTs, and small circuits. Together, these developments advance data driven decision making, improve reproducibility, and accelerate automated testing and yield assessment, bringing more efficient, reliable, and sustainable devices to market.

Research

Pillar Three

The AI for Circuits and Systems Design Automation Pillar advances intelligent methods to streamline the design of complex electronic circuits and systems. A major ongoing project is the development of a toolchain powered by large language models (LLMs) to support analog, digital, and radio frequency (RF) circuit design. This toolchain integrates with commercial electronic design automation (EDA) platforms, facilitating design from natural language specifications so users can express their intent conversationally. By incorporating feedback from power, performance, and area (PPA) analysis throughout the workflow, this approach helps designers to make informed decisions, optimise their work efficiently, and meet target specifications. Leveraging state-of-the-art AI, the project aims to accelerate the design process, reduce errors, and expand the capabilities of automated circuit design and optimisation.





Research

Pillar Four

Pillar Four focuses on Electronics Testing and Verification Automation by embedding AI principles to streamline testing processes and improve prediction accuracy. The goal is to reduce verification time and increase efficiency by enhancing scenario coverage in certification tests across diverse devices and systems, extending even to automatically deciphering physical mechanisms in emerging beyond-CMOS devices.

One ongoing project is a workflow that automates circuit design and testing using commercial EDA tools, enabling faster Radio Frequency (RF) design. By leveraging a Large Language Model (LLM), users can describe the circuit they want, which is then automatically implemented and tested in commercial EDA tools, thus making the process both faster and accessible, even for those unfamiliar with the tool. Building on this, we are also developing AI-driven verification methodologies for digital designs (SoCs/ASICs). This includes using machine learning to guide test generation, accelerate coverage closure, and reduce redundant simulation cycles within traditional-based testbenches. Our approach treats verification not only as a pass/fail process but as a dynamic loop where AI learns from coverage gaps and failure patterns to suggest the next best tests.

By combining these strands, RF design automation, functional verification acceleration, and beyond-CMOS testing, we aim to create a holistic AI-powered verification ecosystem. This ecosystem can adapt across technologies, reduce engineering effort, and shorten time-to-market for next-generation systems.

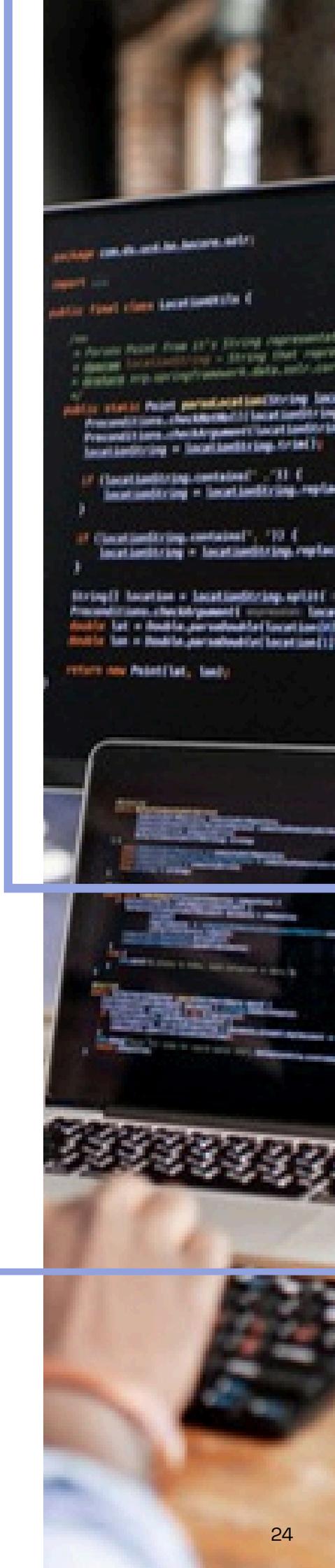


Research

Pillar Five

AI is revolutionising industries worldwide and delivering unprecedented productivity gains across diverse sectors, from healthcare to manufacturing. Indeed, several machine learning (ML) methods have also significantly advanced semiconductor industry, particularly in last few years, by providing sophisticated methods for analysing the performances of the emerging devices. In these emerging devices, CMOS is the current dominant technology for microprocessors, and beyond CMOS refers to future technologies that aim to overcome CMOS's limitations in scaling, power, and speed.

Generally, the tremendous increase of computational power of integrated circuits is supported by the continuing miniaturisation of semiconductor devices' feature size. In this direction, our investigation is ongoing with the ML-guided design and optimisation of ultra-scaled transistors. In parallel, we are also scrutinising how AI can enhance the understanding and optimisation of skyrmion-based systems. These Skyrmions are topologically protected spin configurations, typically observed at the nanoscale in magnetic material.

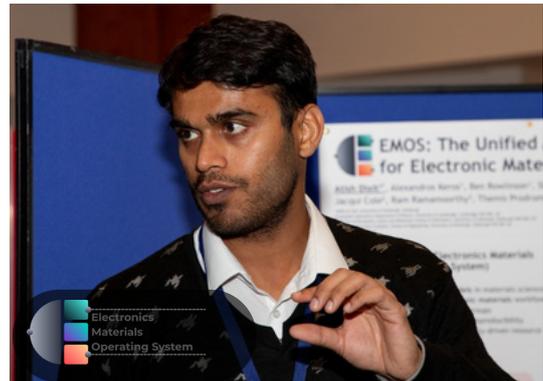


Tools and Resources

The core mission of the APRIL Hub is to accelerate research and innovation through the development of cutting-edge AI-based tools. This section presents the tools currently under development across the electronics supply chain from material discovery and design automation to rigorous testing and verification.

Electronics Materials Operating System (EMOS)

EMOS is an open-source, community-driven web platform designed to accelerate AI-based discovery of electronic materials.



Research in this area is often hindered by fragmented databases, disconnected AI

models, limited interoperability between workflows, and challenges in benchmarking and reproducibility. EMOS addresses these issues by providing a unified, extensible framework that integrates key components of the materials discovery pipeline.

The platform offers access to modular “information units”, including curated materials databases, generative models for materials design, and property prediction models. Researchers can combine these units to build custom pipelines, referred to as “features”, for specific electronic device design tasks. EMOS is built with openness and collaboration in mind, enabling contributors to add new models, datasets, and workflows that seamlessly integrate into the ecosystem. By lowering technical and structural barriers, EMOS aims to promote reproducible, interoperable, and scalable research in electronic materials.

Semiconductor Traceability and AI-Assisted Research System (STARS)

STARS is an automated platform that uses the power of AI to accelerate research and testing in emerging electronic hardware technologies. STARS can automatically test a wide range of semiconductor devices: from memristors and diodes to thin-film transistors (TFTs), micro-electro-mechanical systems (MEMS), and even small digital or analog circuits. This allows researchers to rapidly test millions of devices in a day, at rates that would be impossible manually. Every measurement is stored in an integrated database, providing full traceability from fabrication details, device meta-data, and testing results.

LaMDA: Language Model-Assisted Electronic Design Automation

LaMDA is a large language model (LLM)–driven framework designed to integrate directly with industrial electronic design automation (EDA) workflows. Unlike generic LLM applications and prior research focused on isolated open-source EDA tools, LaMDA embeds knowledge of commercial EDA environments such as Cadence Virtuoso, Keysight ADS, and AMD Vivado. This includes awareness of design rules, file formats, and tool-specific behaviours, enabling the generation of fully compliant design artefacts and accurate interpretation of complex simulation and synthesis logs.

By constraining LLMs with tool rules and incorporating feedback from design outputs—such as power, performance, and area reports—the framework supports LLM-assisted optimisation across analog, digital, and radio-frequency design flows. This reduces reliance on continuous human intervention while maintaining correctness. Case studies on operational transconductance amplifiers, microstrip patch antennas, and FPGA circuits demonstrate that LaMDA functions as a reliable EDA-aware assistant, significantly improving engineering productivity and offering a scalable pathway toward shorter design cycles and lower innovation costs in the electronics sector.

Preprint: <https://arxiv.org/abs/2601.14098>



PhD Cohort

The APRIL AI Hub has welcomed a brilliant new cohort of PhD students. Since joining the Hub, not only have the students made excellent progress with their research and adapted to life as PhD researchers, they have built a supportive and collaborative community. The team have also been actively involved in a range of fantastic outreach activities, including community initiatives supporting older adults, participating in the Edinburgh Science Festival, and featuring on the APRIL Conversations podcast. Members of the group have also been presenting their work at conferences and sharing their research with the wider APRIL community, including a day at William Blair Investment Management. Creativity has also been a highlight too as the entire cohort starred in Semih's submission to the Dance Your PhD competition (which can be viewed on our YouTube page). The aim was to create a video explaining your PhD research through interpretive dance. And when they're away from their desks, the PhD team can often be found playing badminton and table tennis together.

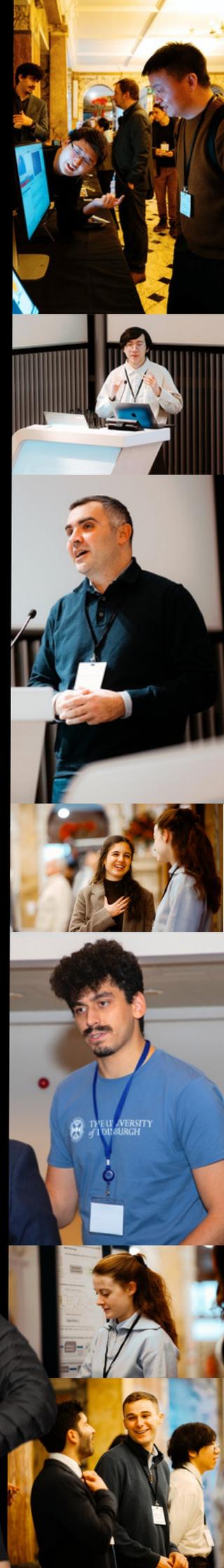
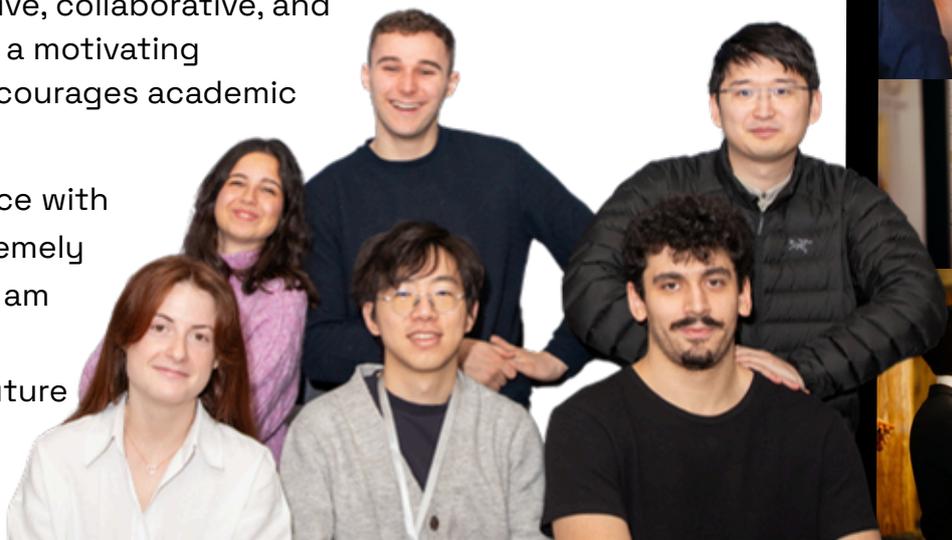
Hear from one of our students about their experience so far:

My experience with the APRIL AI Hub has been truly inspiring. Throughout my time in the Hub, I have been offered opportunities that few PhD students typically experience. Visiting the offices of William Blair in London and presenting at the second APRIL Summit are just a few of the networking events I have had the opportunity to attend. These experiences allowed me to engage with professionals and researchers, exchange ideas, and gain a deeper understanding of how academic research connects with industry and real-world innovation.

The workshops and training sessions organized by APRIL have helped me develop not only my knowledge but also my technical skills as researcher.

However, what I value most about APRIL is its working environment. The team is supportive, collaborative, and welcoming, creating a motivating atmosphere that encourages academic development.

Overall, my experience with APRIL has been extremely positive so far, and I am excited to see what opportunities the future will bring.





Seed Funding

The APRIL AI Hub is committed to enable ground-breaking AI research and innovation through a diverse range of funding opportunities. Academic partners can access seed funding designed to support innovative, early-stage projects that advance responsible AI in the electronics sector – bridging the gap between academia and industry through meaningful collaboration.

Other funding sources are available to support ambitious AI research and innovation. Flexible funding will be used to support unrepresented members or new institutions, whereas sandpits will deliver larger scale projects, each focusing on specific industry sponsored challenges.

- Materials Discovery
- Device Design
- Circuit & Systems Design
- Testing & Verification
- Modelling

- University of St Andrews
- University of Glasgow
- Heriot-Watt University
- University of Edinburgh
- University of Newcastle
- Queen's University Belfast
- University of Cardiff
- University of Bristol
- University of Southampton
- Durham University
- University of Sunderland
- University of Sheffield

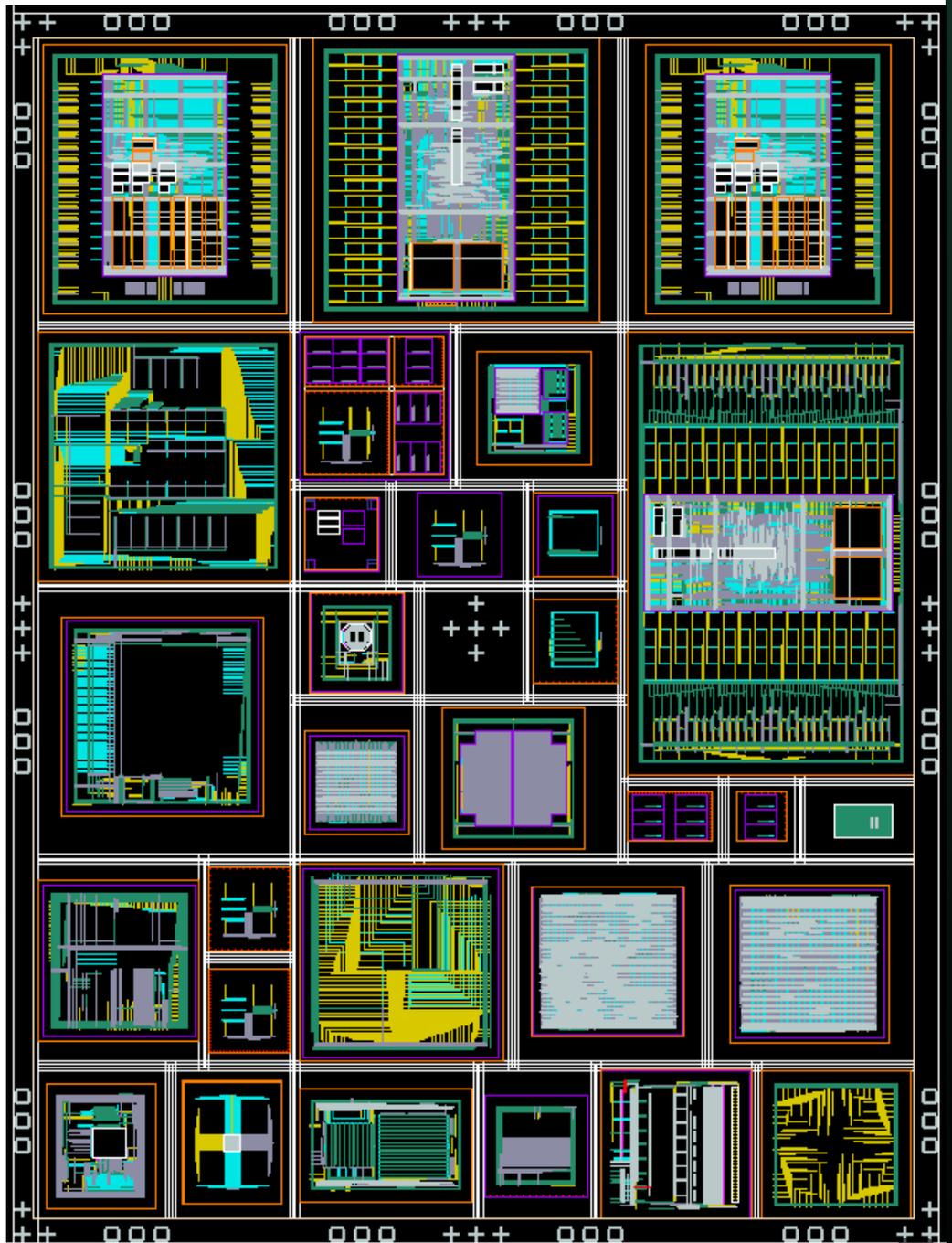


APRIL+

APRIL+ is enabling a community-driven tapeout that gives researchers practical access to new technologies, including emerging approaches such as memristors, alongside more established integrated-circuit design flows. The project lowers barriers to hardware prototyping by providing coordinated support across the full design journey, from early concepts through to fabrication, while using AI tools to help boost the efficiency of the process. In doing so, it supports the translation of ambitious research ideas into tangible hardware outcomes. The work will also generate valuable real-world design data, which will help strengthen and refine our AI models, while supporting future AI-assisted hardware design and driving innovation across the wider research community.

Thank you to Dongxu Guo, Minghui Cui, Yu Wu, Bochen Ye, Yuntao Han, Bartas Abaravicius, Spyros Stathopoulos, Georgios Papandroulidakis, Tianyang Yao, Xin Zhang, Shiwei Wang, Menglin Song, Ahmet Cirakoglu, Danial Khan, James Moore, Yikang Shen, and Linwei Wang for their designs for this tapeout!

Special thanks to Pratibha Verma and Yihan Pan for their hard work in leading the planning and organisation of APRIL+ projects.



Outreach

APRIL

AI Hub for Productive Research
& Innovation in Electronics



APRIL and the Tower of Techport

The APRIL AI Hub worked alongside children's author and illustrator, Ramya Julian, to develop a book for primary school children which aims to introduce students to the concepts of AI, electronics and innovation. The adoption of AI is becoming an increasingly important topic, especially its use in education. By making these concepts accessible, fun and engaging, we hope to inspire and educate a new generation of young people on how AI can be used to help us. We have donated 5,000 copies of this book and counting to schools across the UK, some have even been sent abroad to India and Greece.

APRIL, the brilliant AI robot, lives in Techport, a city powered by incredible technology and vibrant ideas. As New Year's Eve approaches, the Microchip Guardians ask APRIL to help them build a dazzling tower that will light up Techport for the New Year! Soon, APRIL and the Microchip Guardians create a marvel unlike anything Techport has ever seen. But when the city's power source fails, it's up to APRIL's imagination – and a little teamwork – to save the day, and the New Year!



BOND OR BREAK

Bond OR Break

The APRIL AI Hub has developed and launched a card game (akin to Snap) that aims to introduce concepts of electronic engineering and AI to ages 4+, such as Machine Learning and Neural Networks. Contact us if you would like to get a pack!

Players aim to “snap” and claim the pile of cards when two matching cards are placed down on top of each other. The deck is split into Beginners and Advanced. Players can use both decks, or just the Beginner deck, shuffling and dealing cards evenly among players. On each turn, players go clockwise in order, each placing a card face-up in the centre. If two consecutive cards match (see three ways to match below), players race to be the first to shout “Bond!” and claim the pile. If the player claiming the pile is incorrect, another can yell “Break!” and take the pile for themselves. The game continues until one player collects all the cards or the agreed-upon number of rounds is completed.



Google DeepMind Research Ready Internship Scheme 2025



In June 2025, the APRIL AI Hub launched a transformative eight-week internship programme in partnership with the Google DeepMind Research Ready scheme. Designed to support students from underrepresented groups in AI and related fields, the programme aimed to provide meaningful research experience, foster inclusive academic engagement, and nurture the next generation of researchers and innovators.

Twelve talented undergraduate students joined the programme, representing a wide range of academic disciplines—engineering, computer science, chemistry, and physics— coming from leading institutions across the UK. These included the University of Stirling, University of Edinburgh, University of Glasgow, University of Leeds, University of Manchester, University College London (UCL), and the University of Southampton.

The internship programme was designed not just as a technical placement, but as a holistic experience. Alongside their research, interns participated in structured outreach activities, ranging from workshops with school children to digital literacy sessions with older adults, bringing AI discussions to a wide audience and improving their science communication skills. Weekly social events and team-building activities, including Friday fun sessions and collaborative challenges, helped foster a strong cohort identity and a supportive peer network.

This immersive environment provided interns with early exposure to academic research culture, encouraged interdisciplinary thinking, and helped build confidence in their future career paths; whether in postgraduate study, applied research, or industry. It also reinforced APRIL’s commitment to widening participation in AI and semiconductors, and strengthening the UK’s future talent pipeline in emerging technology fields.

We are delighted to be running the programme again in 2026.



ACE IT Scotland



APRIL partnered with local Edinburgh charity, ACE IT, to deliver an intergenerational learning experience on AI through a series of workshops. This initiative combined ACE IT's mission to promote digital inclusion among learners aged over 50, and APRIL's outreach commitment in supporting new generations of AI users.



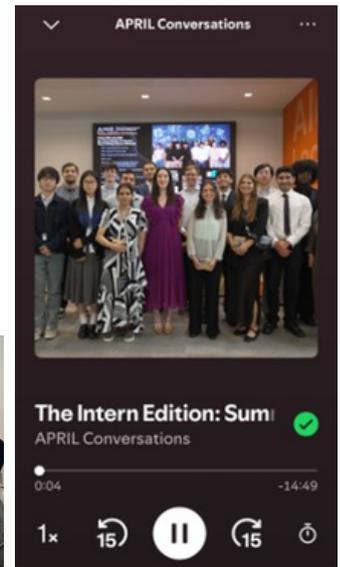
The session welcomed 22 participants from ACE IT who were paired up with 22 researchers from APRIL, including our Google DeepMind Research Ready interns. Across the two sessions, learners engaged in hands-on activities and discussions exploring how AI can be used to tackle loneliness, enhance accessibility, and support daily living. Learners were also paired up with an intern or Early Career Researcher to receive a one-to-one personalised mentoring session on how AI tools might benefit their individual needs. The programme aimed to demystify AI to adult learners and highlight its practical, human-centred applications.

APRIL Conversations

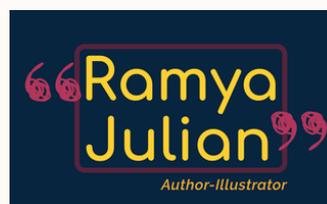
On our podcast, APRIL Conversations, we sit down to talk with a variety of different guests including innovators, researchers, and participants from our outreach activities, to examine the forces driving artificial intelligence forward. Our episodes explore cutting-edge developments transforming this rapidly evolving field. From breakthroughs and ethics to real-world impact and emerging trends, APRIL Conversations is a space for thoughtful, informed discussion about where AI is headed.



Listen Here on Spotify



Outreach and Engagement Collaborators:



Interested in collaborating with us?
Get in touch at APRIL@ed.ac.uk

UK Electronics Skills Foundation

Engagement

APRIL AI Hub is a partnership between the University of Edinburgh, University of Glasgow, Newcastle University, University of Sheffield, Queen's University Belfast, University of Bristol, University of Cambridge, King's College London, and Imperial College London. Working closely with our Pillar Leads, the Hub fosters meaningful connections and drives impactful collaborations across these leading institutions.

Beyond its founding partners, the APRIL AI Hub builds a dynamic ecosystem where academic institutions collaborate to amplify their collective strength in AI innovation. This network enables cross-institutional research, shared expertise, and joint access to cutting-edge infrastructure, datasets, and computational resources—empowering researchers to address complex challenges that no single institution can tackle alone.

Knowledge exchange is at the heart of our mission. Through inter-university workshops and co-authored publications the Hub nurtures a vibrant, collaborative research community that accelerates discovery and impact.

Also central to APRIL's mission is engagement with industry. Through world-class research and technical expertise, APRIL Researchers collaborate with industry partners to support the semiconductor and electronics community in exploring new ways to use AI for new material discovery, smarter chip design, system optimisation, and sustainability.

Beyond innovation, the Hub also plays a vital role in developing skills and capabilities across the ecosystem. Through training programmes, workshops, and joint projects, APRIL is helping to equip the current and next generation of talent with the expertise needed to apply AI responsibly and effectively in semiconductor and electronics applications.

We are continually working to strengthen and grow our network, as it is through invaluable partnerships and collaboration that we push the boundaries of latest research and developments. If you are interested in collaborating with us on any events, training, or knowledge sharing, please reach out at APRIL@ed.ac.uk.



Ethos Workshop Series

APRIL's annual Ethos Workshop Series offers our Researchers, PhD students, and other AI Hubs to learn about and discuss our four ethos points:



Equality, Diversity & Inclusion



Trusted Research



Responsible Research



Environmental Sustainability

We have hosted a variety of speakers including Professor Martin de Heaver from ORBIT RRI, Jenni Sarafilovic, then School of Engineering Equality Diversity and Inclusion Manager, now Lead Change Partner at the University of Edinburgh, Prof. Sean Smith, Director of the Centre for Future Infrastructure and Principal Investigator for The Centre for Net Zero High Density Buildings (CeNZ-HighDB), and Yohannes Scarlett from the Royal Academy of Engineering. These experts in their field have supported our Hub to actively engage with our ethos and consider how it can be ingrained in our work from its foundations.

Webinars

The Hub hosts a variety of events that have online participation, and are made available to watch afterwards on our YouTube Channel. From our Lunch & Learn Series, to our Seed Funding Webinar Series we are committed to accessible knowledge sharing.

Our Seed Funding Webinar Series running in 2026 is set to introduce all 20 of our seed funding projects and give an overview of the goals and desired impact of those projects.

You can also check out our Lunch & Learn Series which ran in 2025. The sessions were online biweekly seminars that brought together academics and professionals working in the field of AI. They provided a platform for participants to share knowledge, discuss emerging research, and exchange perspectives across academia and industry.



Acknowledgements

All of the fantastic work showcased in this booklet could not be achieved without funding from UK Research and Innovation (UKRI)'s Engineering and Physical Sciences Research Council (EPSRC).

We are also grateful towards the Royal Academy of Engineering, Google Deepmind, the Department for Science, Innovation and Technology, and the Hg Foundation for the opportunity to host twelve interns as part of the Google Deepmind Research Ready Internship Scheme 2025. We are also thrilled to be running the programme again in 2026.

We would like to thank our Independent Advisory Board: Ian Donald (Chair), Feras Alkhail, Steve Furber, Mark Girolami, Priya Guha, Jed Hurwitz, Bruce Rae, Gopal Ramchurn, Dimitra Simeonidou, and Alexandra Smyth for all their support, guidance, and advice.

The APRIL AI Hub would like to thank all our collaborators, partners, and contributors for all their hard work in establishing APRIL as a UK centre of excellence of AI for electronics.

We would also like to thank Hazel Cox, Monica Hoyos Flight, and Spyros Stathopoulos, University of Edinburgh, for their continued support of the Hub and its work.





Contact Us

We at the APRIL AI Hub are always keen to collaborate. If you are interested in joining our Network, working with us on a project, or want to coordinate a joint event, please get in touch!



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APRIL



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