Open Call FAQs for Smart Nano: Photonics Capability Programme

What is the Smart Nano: Photonics Capability Programme?

The Smart Nano: Photonics Capability Programme is a fully funded, four-month capability and ecosystem-building programme for organisations with active plans, initiatives or product opportunities involving integrated photonics-enabled technologies, products or solutions.

Building on the success of Digital Catapult's previous Integrated and Industrial Photonics Bootcamps, the programme goes beyond introductory training to help organisations put learning into practice. It is designed to help organisations strengthen their technical capability while progressing company-relevant ideas, workflows and technology roadmaps. Participants will combine expert-led technical training with practical design and simulation assignments, tailored one-to-one guidance and access to specialist expertise and networks across the Northern Ireland photonics ecosystem.

During the four-month programme, selected companies will develop their practical photonics capability with support, while exploring how photonics technologies could support future products, R&D and commercialisation opportunities.

How is the programme structured?

The programme consists of 4 main phases with activities including eocsystem events and group workshops, one to one consultations and support, and self-paced learning exercises.

Phase 1 - Onboarding, Discovery and Design Strategy (w/c November 30th to w/c January 11th)

- Onboarding and Kickoff session: December 1st, Online
- Company Health Scans: w/c November 30th and w/c December 7th, Online
- Keynote Technical talks and Lectures: December 8th, Hybrid
- Design Strategy Sessions: w/c January 4th and 11th, Hybrid

Phase 2 - Component Simulation and Design (w/c January 18th to w/c February 8th)

- 2 days Photonic Component Simulation and design training workshops: w/c January 18th, In-person
- Component simulation and design assignments: Flexible, self-paced activity with bookable online 1-2-1 support.

Phase 3 - Circuit Simulation and Design (w/c 15th February to w/c March 1st)

- 2 or 3 days Photonic Circuit Simulation and Design training workshops: w/c February 15th, In-person
- Photonic Circuit Simulation and Design assignments: Flexible, self-paced activity with bookable online 1-2-1 support

Phase 4 – Wrap up and Readiness Planning (w/c Mar 8th to w/c Mar 22nd)

- Preparation of a readiness report and showcase presentation
- Showcase event: w/c March 22nd, In-person

Please Note: Exact dates and formats of the activities may be subject to change based on cohort availability and preference.

What is Smart Nano NI?

Smart Nano NI is a Northern Ireland consortium which aims to develop game-changing advanced prototyping and smart manufacturing methods to deliver new technologies. The consortium shares a niche capability around nanomanufacturing and world-leading knowledge in photonics.

The consortium has been awarded £42.4m by UK Research and Innovation's Strength in Places Fund. The total project value including leveraged funding from other sources is £63.9m. Our collaboration is aimed at driving self-sustaining local industry and economic growth through research and innovation.

Who can apply to the programme?

This programme is open to UK-registered companies (SMEs, startups and spinouts) with active plans, initiatives or product development opportunities involving photonics-enabled technologies, products or solutions.

Applicants should be able to show how participation will support future R&D, product development, commercialisation or technology adoption goals. Some familiarity with photonics, optics, electronics, simulation or related technical disciplines will be beneficial.

Ideal applicants include:

- Startups, scaleups and SMEs developing photonics-enabled technologies

Companies building photonic components, sensing solutions, integrated photonic products or PIC-based technologies that want to strengthen design, simulation and validation capability.

- Semiconductor, electronics and integrated circuit developers exploring PICs

Companies with relevant technical experience looking to develop PIC architectures, establish design principles, or explore emerging photonic manufacturing routes.

- Product development and R&D teams applying photonics to future solutions

Teams seeking to use photonics in sensing, imaging, communications, computing, quantum-enabled systems or other advanced technology applications.

- Companies in photonics-enabled and adjacent advanced technology sectors

SMEs working across areas such as sensing and IoT, autonomous systems, quantum, AI hardware, semiconductors and optical communications.

Note: Applicants must also be available for the full programme and eligible to receive up to the following amounts in State Aid Assistance, depending on whether one or two delegates from the applicant company intend to avail of simulation and design training and the associated software licences and virtual machine access. Please note, a

maximum of two delegates per participating company may avail of these benefits specifically.

- Up to £15,500 where one individual from the company is availing of simulation and design training and licenses
- Up to £26,000 where two individuals from the company are availing of simulation and design training and licenses

What happens if my application is successful?

If your application is successful, you will be notified by email by Friday the 20th of November.

To accept a place on the programme you will need to complete signing the programme participation agreement and fill and return a State Aid declaration form the following week. You will be asked to provide details of an appropriate business signatory for each of these.

An Onboarding Pack will also be sent to you prior to the kick-off event.

What are the selection process and criteria?

Applications will be scored by a team of Photonics and innovation experts from Digital Catapult and an impartial external judge.

Judging of written applications will be blind, meaning information identifying the company or any individuals will be hidden from the judges.

There are 4 criteria upon which applicants will be assessed, with different weightings per criterion. The selection criteria to assess and select application submissions, and their weightings are detailed below:

- Technical Feasibility, 40% weighting

What this assesses: Your technology, its current stage of development, what makes it innovative and the technical progress you are looking to make.

- Ability to Execute, 20% weighting

What this assesses: Your team, relevant experience and capabilities, and the resources and partnerships you have in place to successfully deliver your plans

- Growth Potential, 20% weighting

What this assesses: Your growth ambitions, the market opportunity for your solution and how you plan to scale and progress the business

- Programme Fit, 20% weighting

What this assesses: Why this programme is relevant to your organisation, what you hope to achieve through participation and how the support could help you progress

How is my information treated?

The application information specific to this programme will be used by Digital Catapult in compliance with GDPR regulations. It will only be used for the purposes of the programme and its evaluation and will be securely retained by Digital Catapult only for the duration of the programme.

A judging panel consisting of two Digital Catapult staff and an external independent judge will receive anonymised responses to the scored selection criteria questions only, for the purposes of participant selection for the open call. Application information passing to judges will be anonymised by removal of reference to company, individual or product or service names or trademarks.

CADFEM UK Ltd, acting as a software licence and infrastructure provider, will be provided with the trading names and registered addresses of selected participant companies and the responses to unscored questions relating to whether applicant companies and delegates have active software licences. This is to facilitate provision of software licences, and virtual machines to run software during training workshops.

How is the programme funded?

The programme has been made possible by the Smart Nano NI consortium, which has been awarded £42.4m from UK Research and Innovation's Strength in Places Fund. The total project value including leveraged funding from other sources is £63.9m.

Do you provide funding for participants?

No, there is no cash funding provided. Participation in the programme is fully funded with no cost to participants.

Where will the programme be based?

This programme will be delivered through a combination of online and in-person engagements:

- Online participation will be via Teams calls.
- In-person engagements will be held at Digital Catapult's Belfast office – 6th floor, 8 Lanyon Place, Belfast, BT1 3LP.

Is travel and subsistence covered?

No, unfortunately the terms of our funding dictate that we are unable to support travel and subsistence for participants.

What will be the benefits of this programme for my business?

By joining the programme, participants will be able to access:

- Fully funded access to training in integrated photonics, PIC design and simulation methodologies led by Digital Catapult photonics expert.
- Opportunities to connect with leading photonics companies, technology providers, researchers and ecosystem partners through technical talks, mentoring and networking activities.
- Up to 10 hours of structured one-to-one support through health scans, design strategy sessions, mentoring and expert office hours to help identify and prioritise photonics opportunities within your business.
- Participation in practical component-level and circuit-level simulation workshops using industry-standard design workflows and tools.

- Guided simulation and design assignments that allow participants to apply new skills to challenges and opportunities relevant to their own products, technologies and markets.
- 9 weeks of access to the Ansys Lumerical, and 2 months of access to the GDS Factory+ photonics simulation and design suites allowing participants to explore and learn in their own time on their own systems.
- Increased confidence in evaluating where photonic integration, miniaturisation and advanced sensing technologies can support future product development and competitive advantage.
- Development of a company-specific health scan and readiness level overview outlining potential technical, commercial and innovation pathways for photonics technology development.
- Opportunities to connect with the Northern Ireland photonics ecosystem, including researchers, manufacturers, technology specialists and future collaborators.
- Showcase and dissemination opportunities followed by ongoing alumni support and funding connections.

What do I need to know about the simulation and design software being offered and used?

The programme provides extended evaluation licences and training using two software suites:

- Ansys Lumerical Enterprise supported by CADFEM UK
- GDS Factory+ supported by DoPlayDo Inc. (the creator of the software)

Software Licences

Software licences are provided as extended evaluation licences for:

- Ansys Lumerical Enterprise – Provided by CADFEM
    - Lumerical Licence Terms
    - Evaluation Licence Terms
- GDS Factory+ - Provided by GDS Factory / DoPlayDo Inc.
    - Business Terms

These allow some flexibility in deployment and allow participants to work independently using their own files and hardware or compute across the simulation and design phases of the programme.

For the in person design and simulation workshops specifically, virtual machines (VMs) hosted by CADFEM running Ansys Lumerical allow for teaching example simulations to be run in the classroom environment from participants' laptops. These laptops will need to access our public guest WiFi network.

Recommended System Specifications

Depending on parameters, complexity and the type of simulation being run, simulation workloads can be compute intensive or take time to complete. Here are example recommended system specifications for Ansys Lumerical and GDS Factory+ solvers. The "Small" option here would be a fast setup for a single workstation, while "Medium" and "Large" would be server setups.

Ansys Lumerical Machine Summary (Single Machine Recommendations)

Taken from CADFEM's Guidance - "Lumerical Hardware Configuration Options for Single Machines"

	Small	**Medium**	**Large**
OS	Windows 11	Windows Server 2022	Windows Server 2022
CPU	12 Cores Core i7 or i9	32 Cores (Xeon Gold or better)	64 Cores (Xeon Gold or better)
RAM*	16 GB DDR5 RAM	256 GB DDR5 RAM	1 TB DDR5 RAM
OS Storage	1 TB NVME SSD	512 MB SSD	2x 512 MB SSD RAID 1
Workdir Storage		1 TB NVME SSD for working directory	1 TB NVME SSD for working directory
GPU* (see notes)			
Networking	10 Gb Ethernet**	10 Gb Ethernet**	10 Gb Ethernet**

Ansys Lumerical Hardware Notes

Taken from CADFEM's Guidance - "Lumerical Hardware Configuration Options for Single Machines"

- Hardware specifications guidelines – Ansys Optics
- Hardware recommendations vary significantly depending on the solver being used. The previous recommendations are largely based on the assumption of the Lumerical FDTD solver. Users primarily interested in other solvers, may be able to use lower end hardware for their simulations.
- The simulation must be capable of being stored in RAM so the memory required will depend on the simulation size.
- GPU acceleration can be used for FDTD simulations and can offer significant speedup. However, the applicability depends on the simulation being run. See the link below for further details. Please discuss with CADFEM before purchasing a GPU for Lumerical.
    - FDTD GPU Solver Information – Ansys Optics
- Medium and Large options built with the idea that they can be used as a multi-user scheduler
- 10 Gb Ethernet specified because Infiniband adds a lot of cost but would be the way to go if a second or further servers were required in the future to act as a small cluster. Alternative
- Could just be a second standalone server depending on requirements.