Photonics Partnership in Horizon Europe

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Photonics21

Nordic Photonics Forum Meeting
26th May 2021
Photonics21 – European Stakeholder Organisation

- Photonics21: More than 3000 members, >1700 affiliations from all over Europe
- Membership open to all, fully democratic structure
- Align public and private R&I Investments in Photonics
- Private Partner to the EU Commission Photonics Public Private Partnerships in Horizon 2020 (2014-20)
Horizon Europe – the new EU framework programme

Horizon Europe Budget: €95.5 billion (2021-2027)
(including €5.4 billion from NGEU – Next Generation Europe – programme of EU for Recovery from COVID-19 crisis)

Political agreement December 2020
€ billion in current prices

- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA
What’s new in Horizon Europe?

- Green Deal, Digitization and Technology Sovereignty – driving forces
- **European Innovation Council (EIC):** one-stop shop to bring the most promising ideas from lab to real world application and support innovative start-ups and companies to scale up their ideas through, inter alia, direct financial support, blended finance
- **EU-wide R&I missions:** range from the cancer, adaptation to climate change, healthy oceans, climate-neutral and smart cities, to soil health and food
- **Open Science:** Mainstreaming of open science practices - European Open Science Cloud
- **New approach on international cooperation / associated countries:** Autonomy in strategic areas key issue
- **Specific Defence Programme:** European Defence Fund
- **Widening countries:** Specific part to improve participation from widening countries
- **New approach on Partnerships:** Horizon Europe cuts back the number of partnerships from ~100 (Horizon2020) to 49. Partnerships important for the recognition as strategic area & only way to ringfence budget for the area. **Photonics under pressure!**

Source: EU Commission
Advocacy towards the member state governments and the European Commission
"We, three European Nobel Laureates, working and living in Europe, firmly believe that it would be a tremendous strategic mistake ..."
Photonics Partnership located in Pillar 2 - Cluster 4

HORIZON EUROPE

SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT*
Exclusive focus on civil applications

Clusters
- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Security
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre

EURATOM

WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA
Widening participation & spreading excellence
Reforming & Enhancing the European R&I system

* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

Source: EU Commission
The aim is to deliver on global challenges and industrial modernisation through concerted research and innovation efforts.

**Key features**
- Simple architecture and toolbox
- Coherent life-cycle approach
- Strategic orientation

**Co-programmed**
Based on Memoranda of Understanding / contractual arrangements; implemented independently by the partners and by Horizon Europe

**Co-funded**
Based on a joint programme agreed and implemented by partners; commitment of partners for financial and in-kind contributions

**Institutionalised**
Based on long-term dimension and need for high integration; partnerships based on Articles 185 / 187 of TFEU and the EIT-Regulation supported by Horizon Europe
Overview of 49 candidate European Partnerships

**HORIZON EUROPE PILLAR II - Global challenges & European industrial competitiveness**

<table>
<thead>
<tr>
<th>CLUSTER 1: Health</th>
<th>CLUSTER 4: Digital, Industry &amp; Space</th>
<th>CLUSTER 5: Climate, Energy &amp; Mobility</th>
<th>CLUSTER 6: Food, Bioeconomy, Agriculture, Bioindustry, Biotechnology...</th>
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</thead>
<tbody>
<tr>
<td>Innovative Health Initiative</td>
<td>Key Digital Technologies</td>
<td>Clean Hydrogen</td>
<td>Circular Bio-based Europe</td>
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<tr>
<td>Global Health Partnership</td>
<td>Smart Networks &amp; Services</td>
<td>Clean Aviation</td>
<td>Rescuing Biodiversity to Safeguard Life on Earth</td>
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<tr>
<td>Transformation of health systems</td>
<td>High Performance Computing</td>
<td>Single European Sky ATM Research 3</td>
<td>Climate Neutral, Sustainable &amp; Productive Blue Economy</td>
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<td>Chemicals risk assessment</td>
<td>European Metrology (Art. 135)</td>
<td>Europe’s Rail</td>
<td>Water4All</td>
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<td>ERA for Health</td>
<td>AI-Data-Robotics</td>
<td>Connected and Automated Mobility (CCAM)</td>
<td>Animal Health &amp; Welfare*</td>
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<tr>
<td>Rare diseases*</td>
<td>Photonics</td>
<td>Batteries</td>
<td>Accelerating Farming Systems Transitions*</td>
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<td>One-Health Anti Microbial Resistance*</td>
<td>Made in Europe</td>
<td>Zero-emission waterborne transport</td>
<td>Agriculture of Data*</td>
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<tr>
<td>Personalised Medicine*</td>
<td>Clean steel – low-carbon steelmaking</td>
<td>Zero-emission road transport</td>
<td>Safe &amp; Sustainable Food System*</td>
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<tr>
<td>Pandemic Preparedness*</td>
<td>Processes4Planet</td>
<td>Built4People</td>
<td>Cultural and Creative Industries</td>
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<tr>
<td>Co-funded or co-programmed</td>
<td>Global competitive space systems**</td>
<td>Clean Energy Transition</td>
<td>European Open Science Cloud</td>
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**PILLAR III - Innovative Europe**

<table>
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<tr>
<th>EIT (KNOWLEDGE &amp; INNOVATION COMMUNITIES)</th>
<th>SUPPORT TO INNOVATION ECOSYSTEMS</th>
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<tr>
<td>InnoEnergy</td>
<td>Innovative SMEs</td>
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<tr>
<td>Climate</td>
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<td>Digital</td>
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<td>Food</td>
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<tr>
<td>Health</td>
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<td>Raw Materials</td>
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<td>Manufacturing</td>
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<td>Urban Mobility</td>
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<td>Cultural and Creative Industries</td>
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**CROSS-PILLARS II & III**

European Open Science Cloud

* Calls with opening dates in 2023-24
** Calls with opening dates not before 2022
Overview of 49 candidate European Partnerships

**HORIZON EUROPE PILLAR II - Global challenges**
- CLUSTER 1: Health
  - Innovative Health Initiative
  - Global Health Partnership
  - Transformation of health systems
  - Chemicals risk assessment
  - ERA for Health
- Rare diseases*
- One-Health Anti MicrObial Resistance*
- Personalised Medicine*
- Pandemic Preparedness*
  - Co-funded or co-programmed

**HORIZON EUROPE PILLAR III - Innovative Europe**
- CLUSTER 4: Digital, Industry & Space
  - Key Digital Technologies
  - Smart Networks & Services
  - High Performance Computing
  - European Metrology (Art. 135)
- AI-Data-Robotics
- Made in Europe
- Clean steel – low-carbon steelmaking
- Processes4Planet
- Global competitive space systems**

**New Horizons**
Securing Europe’s technological sovereignty through Photonics

Multi-annual Strategic Research and Innovation Agenda of the Horizon Europe Photonics Partnership

- * Calls with opening dates in 2023-24
- ** Calls with opening dates not before 2022
New Structure: Closer cooperation with end user industries and other deep technologies

- Innovative Health Initiative
- Personalized Medicine
- Pre-clinical Health
- Transformation Health systems in a digital society

- Sustainable EU agriculture
- Transition of farming systems
- Safe and sustainable Food
- Animal Health – Fighting diseases
- EIT Food

- Key Digital Technologies
- Smart Network & Services
- HPC, Quantum FET
- AI, data & robotics
- Cyber Security

- European Metrology
- Global competitive Space System
- European Defence Fund
- Chemical Risk assessment

- Made in Europe
- Carbon Neutral & Circular Industry
- Clean Energy Transition
- Innovative SMEs

- Zero Emission Road Transport
- Mobility and Safety for automated Road Transport
- Clean Energy Transition
- Industrial Battery Value Chain
### Future Structure Photonics Partnership – (example)

Example Visions of topics and contents which in future should be carried out in the Work Groups

#### Health
- Cancer
- Opto Genetics
- Personalized Medicine
- Mobile Biosensors & Image Systems
- Photonic Drug Testing
- Real Time Proteomics, Genomics, Metabolics
- Human centric lighting system

#### Digital Infrastructure
- HPC, IoT, 5G
- Cyber Security, Secured Communications
- Optical networks// Data Intelligence Hubs for AI
- Zero downtime in a terabit economy
- Photonics Components for Quantum Computing and Cryptography

#### Manufacturing
- Industry 4.0
- Robot cooperation
- AI / Machine Learning for flexible production
- Quality control and non-destructive testing
- Photonics for Circular Economy & Recycling
- Materials for photonic production and photon induced material modification

#### Safety, Security & Defence
- Civil Safety & Security
- Surveillance & Monitoring Systems, Non destructive observation systems (e.g. in construction)
- Defence Systems
- Munition Imaging (mines) and Weapon Guiding Systems

#### Agro and Food
- Precious farming for lower fertilizers, herbicides, fungicides
- On the fly 100 % quality control along the food processing value chain
- Light based enrichment of substances in plants for medical application and food enrichments

#### Mobility
- Autonomous driving systems by sensors, imaging and wireless connectivity
- Smart Lighting Systems for enhanced security
- Real-time Road (and Track) Track Control and Traffic Monitoring
- Smart City / Smart Parking and Traffic Flow Systems
- Logistics

### Core Products and Applications
- Materials for Optical Components & Systems, Production Processes for components, Robots and Human/Robots Cooperation
- Materials for Light & Laser Sources, IC, Masks,
- Photonic Components and Systems, Lenses, Optical Fibers, PICs, Freeform Optics
- Optical Sensors, LIDAR, Spectrometers, High-precision VIS/NIR/MIR/FIR spectroscopy and imagers, Surveillance Systems
- LEDs, Nano-LEDs; Human centric lighting system, Low loss LED drivers with sensor functionality and connectivity

### Core Tasks
- Next Generation Skills Sets: Skill sets & Training - Education and Training
- Standards and Regulations
Work Programme 2021/22 –
First Photonics Partnership Calls in Horizon Europe

- Advanced optical communication components (IA)
- Advanced Photonic Integrated Circuits (RIA)
- Advanced multi-sensing systems (RIA)
- Laser-based technologies for green manufacturing (RIA) - Made in Europe Partnership

Preliminary information: Official publication of the first "Horizon Europe" work programme is still pending!!!
Further information

Thank you for your attention!

• For any further information you can contact Photonics21: secretariat@photonics21.org

• Further information available at: www.photonics21.org

• Follow us on twitter: https://twitter.com/Photonics21

• Follow us on LinkedIn: https://www.linkedin.com/company/Photonics21