

Call to Action

Invest in Excellent Research

Highly innovative ecosystems emerge at outstanding academic institutions that serve as talent magnets and incubators of innovation. In modern AI, industrial innovation and cutting-edge academic research go hand in hand. New research institutions both private (DeepMind, Google Brain, Facebook AI Research, Open AI) and public (Vector Institute, MILA) play this dual role by offering agile environments and outstanding research conditions. The ELLIS initiative's long-term goal is to establish a pan-European Artificial Intelligence laboratory inspired by models such as the European Molecular Biology Laboratory (EMBL) (<https://ellis.eu/en/letter>). It will comprise *ELLIS Units and Institutes* that attract outstanding scientists and provide them with the means to generate scientific, economic, and societal innovation.

Support ELLIS Units

The now established set of *ELLIS Units* within existing institutions integrates local AI ecosystems into a European network, joining forces in the competition for talent, scientific innovation, and economic impact. The units were selected for excellence by a competitive process, and we ask countries and regions to support their units and contribute towards their annual budget. This should include a component of unrestricted funds of at least 300k Euro per year and unit, to facilitate the implementation of the envisioned European network initiatives.

Work towards ELLIS Institutes

The legal and financial basis for outstanding European AI calls for the strong commitment of national governments as well as intergovernmental coordination. ELLIS Institutes should offer highly attractive conditions for top talent, unprecedented agility and an optimal infrastructure to incubate spin-offs such as start-ups, new academic research groups, or social enterprises. An ELLIS Institute will require significant resources (building costs as well as an annual budget increasing to EUR 30-40 million). We encourage all European countries to consider setting up ELLIS Institutes. Countries, federal states / regions, and private donors are invited to join this process.

Invest in computing capacity and data availability

Modern AI methods require training on large datasets. Improving upon the state-of-the-art requires extensive experimentation and thus access to meaningful datasets and major computing capacity. While AI groups across Europe are producing excellent research published at top conferences, computing capacity is becoming a limiting factor in their impact, contributing to a declining share of top European research publications in the field. As a swift yet effective measure, each European country should contribute to a distributed cloud-based high performance computing facility suitable for machine learning, with the goal that every researcher has access to a number of GPUs that is in the same magnitude range of what researchers and interns get in major industrial research labs. In terms of data availability, a significant portion of valuable data is privately held or not accessible for research. The European strategy on creating a European Data Space could certainly help.

Expand Fellow Programs to foster excellent research in key areas

Addressing a key issue from an earlier Call to Action,¹ ELLIS has already launched a broad range of pan-European [Fellow Programs](#). These programs, directed by outstanding European researchers and including the most promising researchers as Program Fellows, focus on high-impact problem areas that have the potential to move the needle in modern AI. They bring together academics at regular meetings throughout Europe, aim to provide them with a stipend to be used flexibly for research, and help create a community of top European AI researchers, thus retaining and attracting talent. To maintain and extend the existing programs, funding is needed. To make these programs comparable to a [CIFAR](#)² fellowship program, 2Mio Euro/year is needed for each program. Accordingly, 15 programs would require 30Mio Euro/year.

Invest in Training and Outreach

Build a PhD program

A pan-European PhD program can help attract international talent to Europe, with downstream impact on both basic research and entrepreneurship. This will benefit top labs as well as labs that are still catching up: excellent PhD students work throughout Europe and sometimes cannot realize their full potential in a lab lacking funding or critical mass of senior talent. Towards this goal, the recruited PhD students will register as students at an ELLIS site, but also spend one year abroad. In addition, regular bootcamps, summer/winter schools, workshops and internships in academia and industry will help make this the most desired PhD program in the world. With an initial target network of 200 PhD students, the ELLIS PhD program will require an annual investment of EUR 10 million across Europe.

ELLIS submitted a proposal for the EU call [ICT-48-2020: Towards a vibrant European network of AI excellence centres](#)³ that [was selected](#) to enter Grant Agreement Preparation with top scores awarded among all proposals for this round. The proposal, called ELISE, will devote 12 million EUR in funding towards networking activities including the Fellow and PhD Programs.

Support early career awards for PhD graduates

Progress in AI is significantly driven by young PhD graduates, who currently often prefer attractive industry jobs to university positions. This issue needs to be addressed now, lest we will be unable to recruit top professors in a few years down the line. We propose setting up early career awards to incentivize truly outstanding graduates to do an academic postdoc. Awards should help reduce the salary gap to industry positions and include funding to visit international labs. Across Europe, such a program should grow to a size of EUR 10 million annually.

Develop a pool of “AI-ready” experts from a broad range of backgrounds and disciplines

The application of machine learning (i.e., data-driven AI) across industry sectors offers significant economic and social benefits. To realize these benefits safely and rapidly, and to meet the demand from European industry for talent in data-driven AI, building a broad and diverse talent pool will be

¹<https://ellis.eu/de/news/leading-european-ai-scientists-issue-a-call-to-action>

²<https://www.cifar.ca/research/program/learning-in-machines-brains>

³https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/h2020-leit-ict-2018-2020-05-27_draf_pre-publication.pdf

decisive. ELLIS units are planning and implementing a range of mechanisms to help achieve this, including summer schools, bootcamps, and traineeships for engineers and developers working in other research areas. All of them require financial support.

Help us spread AI concepts and foster diversity

European citizens can benefit from understanding key concepts in modern AI, and addressing the lack of diversity in AI requires getting minority groups engaged from a young age. ELLIS sites tackle this for instance in the Elements of AI Program (<https://www.elementsofai.com>) as well as in a contest (<http://bw-ki.de>) for high school students working on their own AI projects. Computational Thinking (including not just machine learning, but also programming, algorithms, data, networks, hardware) should become part of schools' core curricula from an early age.

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