

JULY 2014

Newsletter



FOREWORD

ERASynBio has come to an end, but every end is just a new beginning and the good news is most partners will continue developing European synthetic biology through a self-sustainable initiative. **A look into the future of ERASynBio** is provided by Dr. Marrión Karrasch-Bott, who will succeed Dr. Kremser in coordinating the self-sustainable initiative. The initiative will build on the **successes of ERASynBio**, a snapshot of which this newsletter will also give you. In addition the most notable **events** and **summer schools** of 2015 are also summarized. Finish your reading by traveling overseas to look into **synbio research in the US**, a piece provided by our US observing partner and call participant, the NSF. And, as always, don't forget to click on the **links** for the extra information.

Let us finish off by saying it's been a true pleasure preparing these pages for you in the past three years. All the comments you have provided will be taken up in future newsletters the new self-sustained ERASynBio will continue issuing to keep you informed about its activities and plans for the future. A new website is also being prepared which will provide up to date information on current developments and happenings in the European synthetic biology community and beyond.

On behalf of ERASynBio we wish you a happy and prosperous 2015 and enjoy the read!

Kim Turk



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DEVELOPMENT AND COORDINATION OF SYNTHETIC BIOLOGY IN THE EUROPEAN RESEARCH AREA

ERASynBio aims at promoting the development of synthetic biology by structuring and coordinating national efforts and investment, with the final goal of creating a sound European research community in the field avoiding national fragmentation from the very start.

MAIN ACTIVITIES

- Supporting the emergence of national synthetic biology programs based on a strategic research agenda
- Transnational funding activities via joint calls (2 joint calls)
- Strengthening the scientific community by offering training and educational possibilities
- Developing recommendations on governance concepts and regulatory models by integrating ethical, legal, societal and technical aspects of synthetic biology
- Promoting close cooperation between academia and industry
- Providing extensive dialogue options and exchange fora in which all stakeholders can participate

DURATION

36 months (1.1.2012 – 31.12.2014)

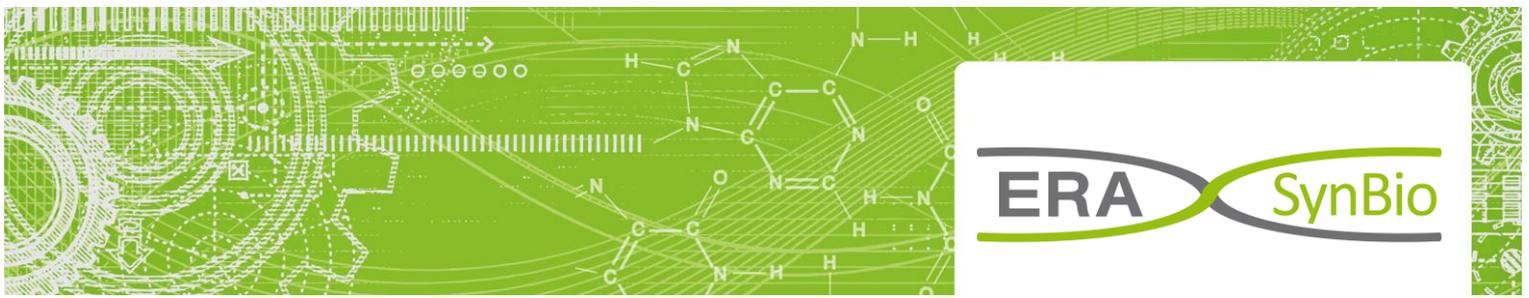
EC FUNDING

1.997.022 Euros

PARTNERS

16 from 14 European countries





ERASynBio IN ACTION

LATESTS DEVELOPMENTS

- Second summer school organized in Norwich in September 2014 in collaboration with Open Plant
- ERASynBio supported the iGEM World Jamboree in October 2014
- ERASynBio Kickoff Workshop organized in November 2014
- Second call for research project proposals closed, proposals evaluated, results to be announced early 2015

Past vs. Future

by Marion Karrasch-Bott, PTJ Jülich

ERASynBio was an initiative of international funding agencies working together to promote the robust development of Synthetic Biology and to structure and coordinate national efforts and funding programs. The network was created in 2012 and funded by the European Commission under FP7. From 2015 onwards, ERASynBio will operate as a self-sustainable initiative (i.e. without the financial support of the EC), with most ERA-Net partners continuing their collaboration in the next step.

From 2012 till 2014, ERASynBio launched two joint calls. It is the major aim of the self-sustainable ERASynBio initiative to continue joint activities like joint calls for proposals in the field of synthetic biology. The next joint call on synthetic biology will presumably be published in the beginning of 2016. This call will mainly be supported by the ERASynBio partners, but will also be open to other funding organizations interested in participating in the joint call.

Along with the 2 joint calls, several supporting measures were initiated by ERASynBio in order to support the development of high quality Synthetic Biology research. One major effort was the development of a Strategic Vision accompanied by a series of targeted recommendations designed to empower national and international funding organizations, policy bodies and other stakeholders.

The sustainable ERASynBio initiative will continue to foster the development and coordination in Synthetic Biology in collaboration with other ongoing projects and initiatives in the field of synthetic biology, e.g. the [Synergene project](#). It is the aim of the sustainable ERASynBio initiative to further support joint activities that focus on transnational coordination, capacity building, sharing resources and facilities, enhancing interdisciplinary and overcoming fragmentation in Synthetic Biology.

ERASYNBIO'S DEFINITION OF SYNTHETIC BIOLOGY

Synthetic Biology is the engineering of biology: the deliberate (re)design and construction of novel biological and biologically based parts, devices and systems to perform new functions for useful purposes, that draws on principles elucidated from biology and engineering.

A look into the ERASynBio 2nd joint call for transnational research projects

Goal - Building Synthetic Biology capacity through innovative transnational projects

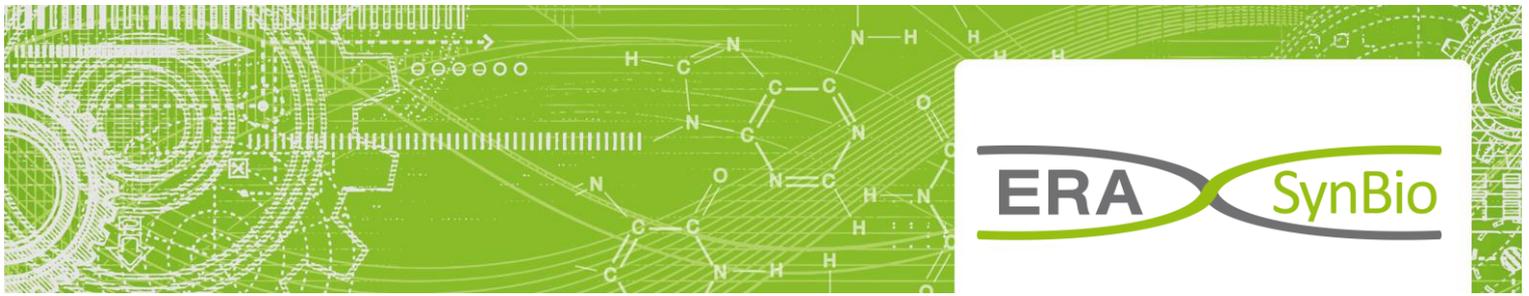
Call partners - CH, DE, DK, ES, FI, FR, LT, NO, PT, SI, UK, US

48 proposals applications received, with 235 different participating partner organizations

Focus on Metabolic engineering (15), followed by Regulatory circuits (13), Bionanoscience (7), Orthogonal biosystems (7), Minimal genomes (4) and Protocells (2)

Visit the ERASynBio webpage for results. To be announced early 2015.





WHAT WE HAVE ACHIEVED

A Strategic Vision for Synthetic Biology



To capitalize on the new opportunities offered by synthetic biology, ERASynBio has developed an ambitious **Vision for the future of European synthetic biology**, highlighting major opportunities and challenges over the next five to ten years. ERASynBio has developed a series of specific, measurable, attainable and timely recommendations to help achieve this vision:

- Invest in innovative, transnational and networked synthetic biology research
- Develop and implement synthetic biology in a responsible and inclusive manner
- Build a networked, multidisciplinary and transnational research and policy making community
- Support the future of synthetic biology by providing a skilled, creative and interconnected workforce
- Utilize open, cutting-edge data and underpinning technologies

Catalogue on Social Sciences Research topics in Synthetic Biology

What specific social science expertise is needed to ensure a rightly progress of synthetic biology research? Based on information collected through desk research and information collected during ERASynBio's 2 Strategic conferences three main research areas, namely Assessment, understanding and management of scientific development; Communication and Analysis of ethical and philosophical aspects, were identified as crucial areas in which Social Sciences can have an impact. ERASynBio's "Catalogue on Social Science Research Topics in Synthetic Biology" explores these areas and provides a list of suggested actions to be taken by social scientists.

Governance and Society

Europeans consider synthetic biology a sensitive technology that demands precaution, special laws and regulations, but if they exist, a considerable part of the public approves research in the field. ERASynBio looked into different governance aspects of synthetic biology by examining and evaluating existing frameworks and regulations and provided an opportunity for central questions of governance to be discussed in a dedicated workshop with invited experts (Vienna, March 2013). The document presenting central ideas and recommendations from relevant reports by bioethics councils and commissions at European and international level with distilled outcomes of the workshop will be available for download on the new ERASynbio website.

Activity Catalogue for Measures in Public Dialogue

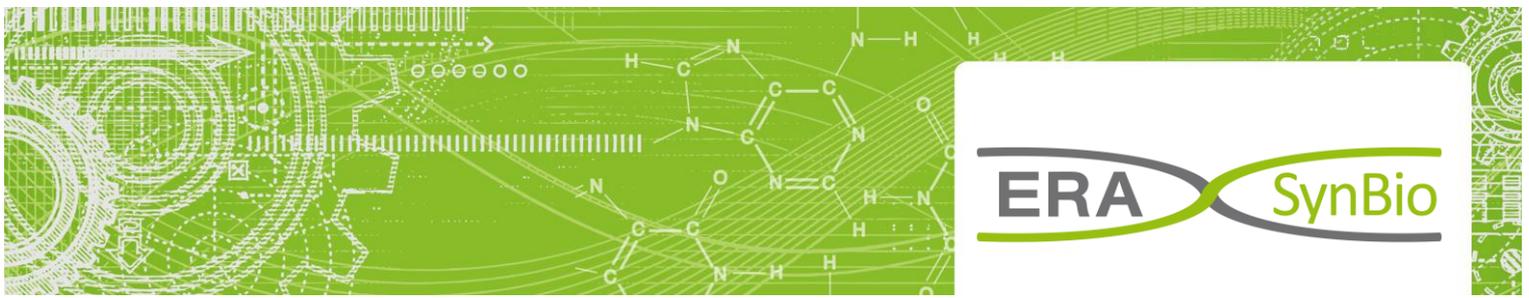
Public engagement plays a crucial role in communicating synthetic biology research to the public in an open dialogue. ERASynBio looked into a wide range of reports from national and international public institutions, which investigate and offer recommendations on how public dialogue on Synthetic Biology can best be implemented, and it can effect regulatory bodies and research funding. ERASynBio's "Activity Catalogue for Measures in Public Dialogue" offers a new contribution to the mapping of efficient models of public engagement in synthetic biology presenting examples of past and current activities on public engagement and public dialogue in the field.



iGEM support

In addition to supporting the iGEM competition, ERASynBio supported European teams participating in the World Jamboree. 18 teams were supported in 2012, 24 in 2013 and 20 in 2014. For team impressions from iGEM check our previous newsletters (2nd and 4th edition).





Twinning program

ERASynBio developed an original activity, the Twinning program, aimed at facilitating the informal start-up of new scientific collaborations and consortia. Minimal requirements were imposed only to ensure that the activity served the community spirit. Brief applications coming at any moment from small international groups of scientists were processed in an average of four workdays by a dedicated scientific board. With 22 applications in two years (20 were approved with an average budget of 4100 € each), this Twinning program has met with unprecedented success, proving it fulfilled a real need. The activity resulted in numerous started collaborations and submitted proposals to ERASynBio and H2020 calls and has been mentioned in the 2014 OECD publication Emerging Policy Issues in Synthetic Biology (p.86).

Synthetic biology Centers' Workshops

Building a European scientific community is crucial at the current stage of synthetic biology development, if critical mass is to be achieved. Two one-day workshops (at Imperial College London in July 2013 and at Genopole, Paris area, in July 2014) brought together already established centers, to work out synergies between them by exchanging common goals and complementarities, and use them as reference centres for more scattered competences. With 24 and 33 delegates, respectively, the workshops constituted a privileged moment to contemplate and contribute to the ascending momentum of synthetic biology in Europe. Three Workshop booklets contain essential information on the workshops, Center descriptions, abstracts, summaries and conclusions will be available for download.

Intellectual property rights & synthetic biology



Emergent areas such as Synthetic Biology question the validity of the patent system, this demanding a discussion on various issues related to IPRs in Synthetic Biology. What is the impact of the current IPR framework on innovation in SB? Is there any empirical evidence of a negative/positive impact? If there is a negative impact, how can this be tackled? ERASynBio brought together ten experts from different backgrounds, for a dedicated workshop to discuss the issue at hand and provide recommendations (Copenhagen, November 2013). A full report including a list of recommendations will be available for download on the new ERASynbio website.

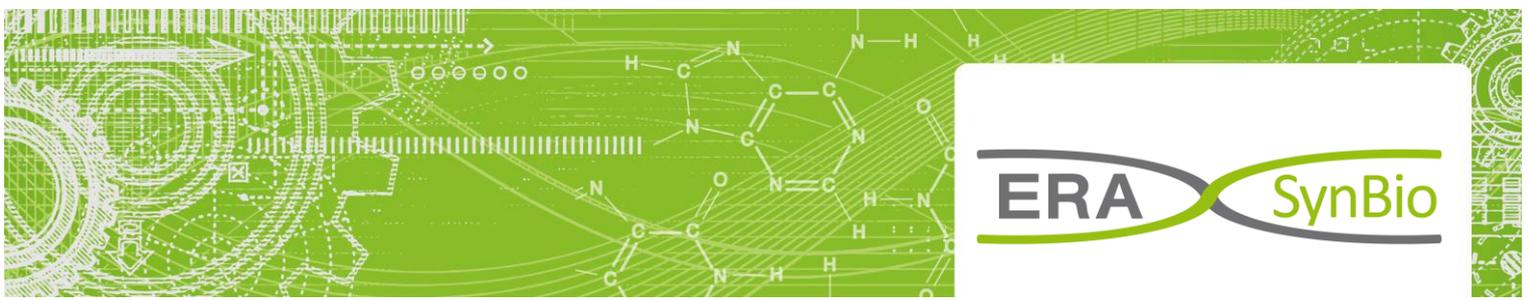
ERASynBio Summer Schools



ERASynBio joined forces with the ST-FLOW project in 2013 and with Open Plant in 2014 to organize two ERASynBio summerschools. During the first summer school 16 participants enjoyed a hands-on course of advanced genetic engineering of bacteria at the onset of the synbio era. Divided into different groups covering different sections of the assembly line (from conceptualization to construct readout), the course ran a kind of sociological experiment for monitoring how individuals react to NOT developing all aspects of a single synbio project but running technically related aspects of a large number of projects - a kind of SynBio Assembly Line (SBAL). Providing a platform for exchange of knowledge, tools and standards, the course hosted many prominent synthetic biology experts and a virtual appearance of Drew Endy.

During the second summer school 20 PhD students and early career post doctoral researchers were invited for 'An Introduction to Synthetic Biology in Plant Systems'. This was the first synthetic biology summer school to focus specifically on plant systems and reflected the burgeoning interest in the area from both the synthetic biology and plant science communities.





Participants had a variety of research backgrounds and levels of experience, and some of the participants had no previous plant science knowledge, so the major challenge was to devise a program that would be engaging and instructive at all levels. As a result, participants were trained through a diverse course of lectures, practical sessions and group projects, covering a wide range of theoretical, technical and ethical content in this expanding discipline.



INVITATION TO SUBMIT COMMENTS: Public Consultation on the Preliminary Opinion on Synthetic Biology II - Risk assessment methodologies and safety aspects

The European Commission and its Scientific Committees have launched a public consultation on the [Preliminary opinion on Synthetic Biology II- Risk assessment methodologies and safety aspects](#). The opinion addresses the implications of likely developments in SynBio on human and animal health and on the environment and looks at existing EU health and environmental risk assessment practices concerning GMOs to see if they are adequate for SynBio. All interested parties are invited to [submit written comments](#) on the preliminary opinion by **03 February 2015** to enable Scientific Committees to focus on issues that need to be further investigated.

JOIN THE COMMUNITY & EXPAND YOUR KNOWLEDGE in 2015

[Keystone symposia: Precision Genome Engineering and Synthetic Biology](#), Montana, January 11-16

[ICSB 2015: XIII International Conference on Systems Biology](#), Zurich, January 13-14

[SynBioBeta](#), London, April 22-23

[Gordon conference: Advancing Biosystems Design](#), Maine, June 28 – July 3

2nd CAS Conference, Munich, July

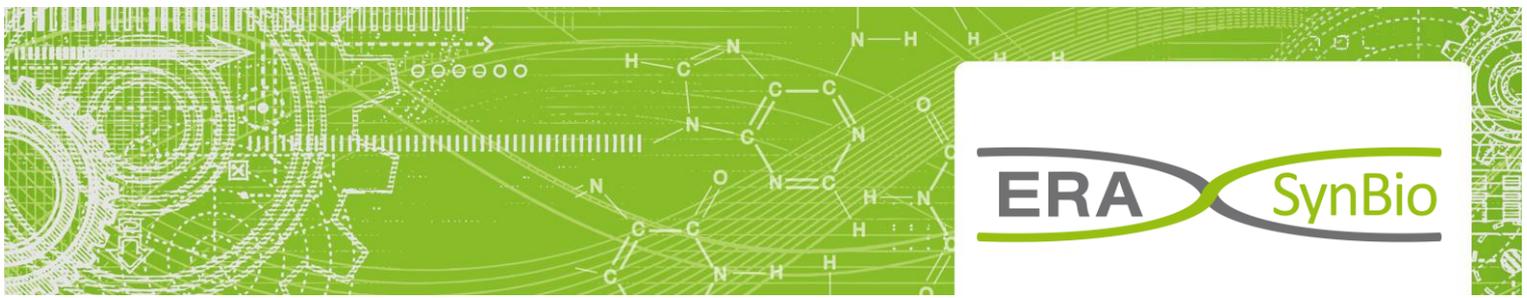
[SSB'15](#) Thematic Research School on Advances in Systems and Synthetic Biology - Modelling complex biological systems in the context of genomics". Strasbourg, 23-27 March. *Registration deadline March 6 (early bird February 9).*

[EMBO practical course: Synthetic Biology in Action](#), Heidelberg, 8-20 June. *Application deadline 12 March.*

[SSBSS 2015](#), Synthetic and Systems Biology Summer School - Biology meets Engineering and Computer Science. Taormina, Sicily. July 5-9. *Application deadline February 15.*

Do you know the Synthetic Biology Open Language (SBOL)? SBOL is a data exchange standard for descriptions of genetic parts, devices, modules, and systems. You can learn more about it [here](#).





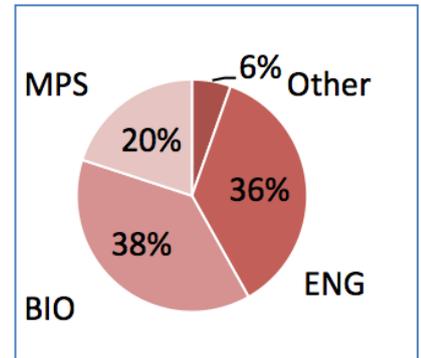
A LOOK ACROSS THE OCEAN – Synthetic Biology in the USA*



The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense. With an annual budget of \$7.2 billion (FY 2014), NSF is the funding source for approximately 24 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

National Funding in Synthetic Biology since 2005 is estimated to exceed \$600M with NSF, the Departments of Energy and Defense making major investments in this area.

The majority of **NSF funding** in this area comes from the Engineering (ENG) and Biological Sciences (BIO) Directorates and of NSF followed by programs in Directorates for Mathematical and Physical Sciences (MPS) and Computer and Information Sciences and Engineering (CISE). Other Directorates also contribute to research in synthetic biology. Close cooperation exists between programs in ENG, BIO, MPS and CISE; but also with the Directorate for Social, Behavioral and Economic Sciences (SBE). Most recently other programs at NSF expressed an interest leading to an agency-wide informal working group to develop a strategic vision and activities for the agency.



NSF's International Engagement in Synthetic Biology. 2008 marked the beginning of NSF's international engagement in the area of synthetic biology with an IDEAS LAB or "Sandpit" exercise in synthetic biology organized by NSF MCB and Physics and the Engineering and Physical Science Research Council (EPSRC) in the UK. Five projects were selected for co-funding. It led to fruitful bilateral collaborations several of which are still going strong. Other IDEAS Labs followed in recent years in collaboration the UK BBSRC focus respectively on Photosynthetic Refineries and the Nitrogen: Improving on Nature.

NSF and ERASynBio. In 2012 a visit from a group of European funders and scientists involved in ERASynBio with the mission to scope the status of US Synthetic Biology from the perspective of national funding and regulatory agencies and leading US academic and industrial Synthetic practitioners. The trip was successful in many ways. For the NSF, it presented an opportunity to partake in the ERASynBio transnational funding scheme with participation in the first (2012) and second ERASynBio call (2014) contributing nearly \$6 Mill to fund the most exciting transatlantic synthetic biology collaborations. Most noteworthy is the fact that the majority of proposals submitted included US participants as did the proposals selected for an award. NSF is looking forward to continued collaboration in future ERASynBio activities.

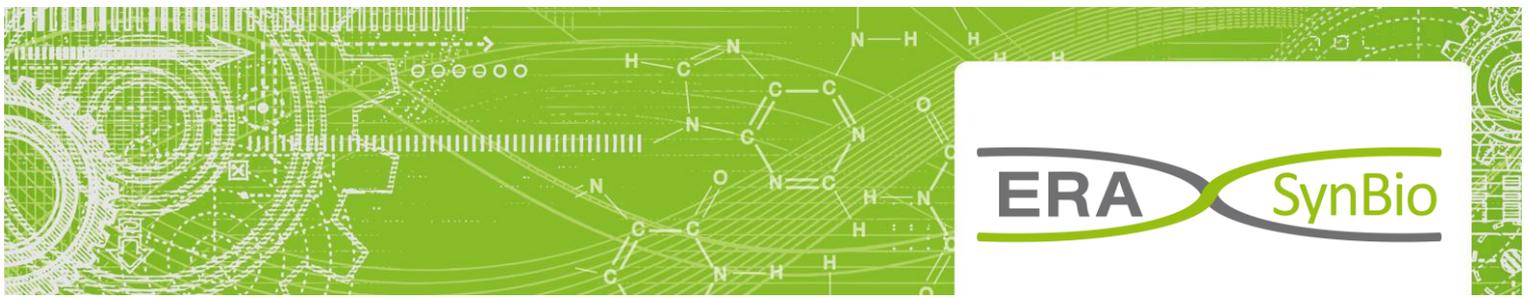
The NSF programs in MCB and the Division of Biological Infrastructure (DBI) have recently established a bilateral funding mechanism with the UK BBSRC the area of synthetic Biology. Projects with the majority of the research performed in the US were submitted to NSF, and correspondingly, those with a concentration of activities in the UK were submitted for review to the BBSRC. The proposals are being reviewed at the respective agency and proposals will be selected for funding after a consensus of fundable proposals has been reached between the parties involved. The response to in this call was beyond expectation, again demonstrating the interest of the community to engage in international researchers in synthetic biology. NSF has funded the coordination of US international collaborations associated with Yeast Genome Synthesis project (Boeke and Bader) through NSF's "Science Across Virtual Institutes) (**SAVI**) program.

A separate bilateral international funding activity between NSF BIO and the Japan Science and Technology (JST) was focused on advancing Metabolism: for a Low Carbon Society. Four projects were funded totaling a combined \$ 12 Mill investment for three years. Some of these proposals qualified for a creativity extension. In Nov. 2014, representatives from NSF and USDA together with leading scientists in synthetic biology participated in an Indo US Conference and Workshop on Synthetic and Systems Biology at JNU, New Delhi to explore joint initiatives and exchanges in these areas. The workshop was successful and parallel discussion with representatives from the Ministry of Science and Technology outlined are reasonable path toward future collaboration in the areas of systems and Synthetic Biology.

All these activities demonstrate the US funders and Scientist see the need for the globalization of Synthetic Biology to leverage the intellectual and monetary assets to advance the science, ensure a common them for the safe and ethical conduct, and address issues such as open source, intellectual property and laws jointly.

* For a detailed article on Synthetic biology in the USA [visit our website.](#)





MEET THE PARTNERS**

**Click on the partner names to learn more about them

Austria



Denmark



France



Finland



Germany



Greece



The Netherlands



Latvia



Portugal



Slovenia



Spain



Switzerland



United Kingdom



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Newsletter preparation

Kim Turk (MIZS). With the contribution of WP leaders, other partners and the ERASynBio community.

For a free subscription to future newsletter from ERASynBio, please visit our website www.erasynbio.net

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