

Synenergische Forum 2016

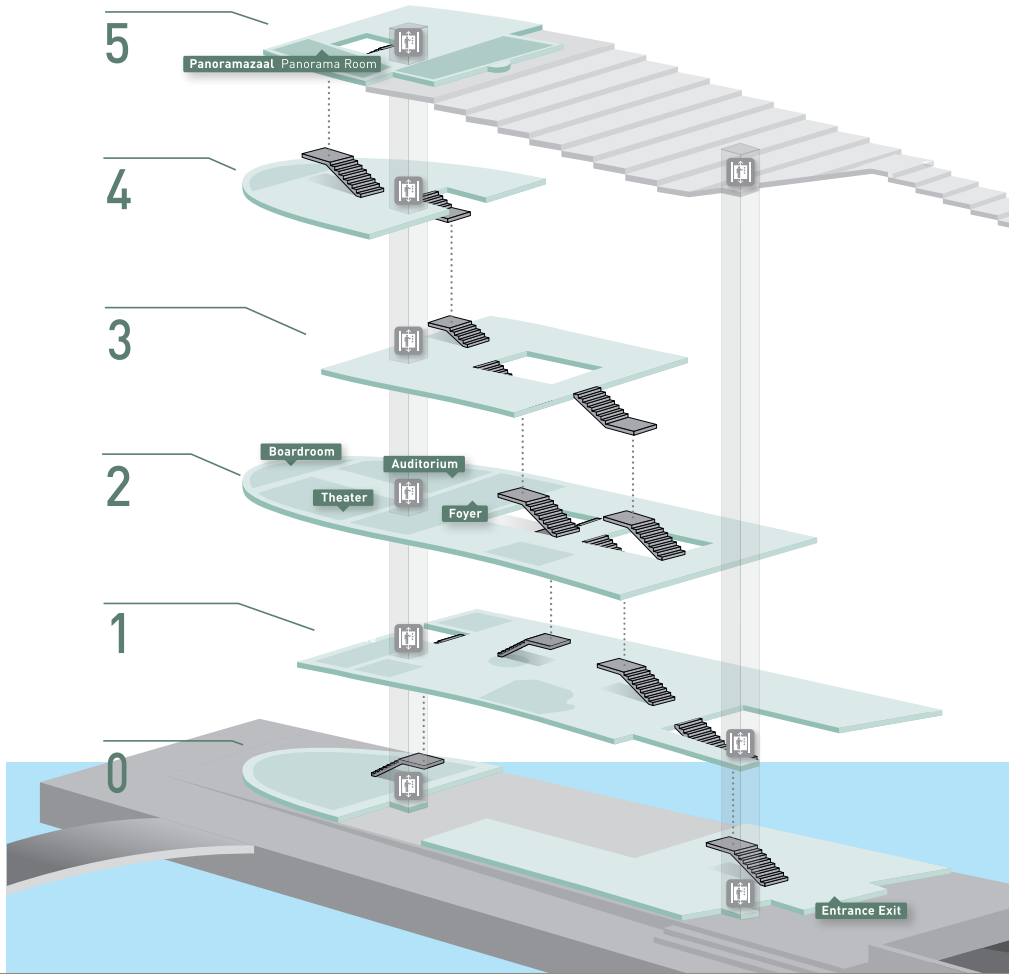
NEMO, Amsterdam, the Netherlands | Friday & Saturday June 24-25th

PROGRAMME

SHARE & LEARN
**SYNTHETIC
BIOLOGY**
VISIONS OF
THE FUTURE

30 JAAR
Rathenau Instituut

NEMO Floorplan



Route between NEMO and Mediamatic (Film festival)



Welcome

Welcome to the SYNENERGENE Forum, *Synthetic Biology – visions of the future*, where we will discuss responsible research and innovation in synthetic biology. The concept of responsible research and innovation has been defined in many different ways. But what all these definitions share is the need to involve societal stakeholders, organisations and the general public more intimately in processes and spaces where science, technology and society shape each other. The SYNENERGENE Forum reflects this aim in its programme today and tomorrow, in its audience, and in its venue, the NEMO science centre in Amsterdam.

Four years ago, the Rathenau Instituut published a policy brief arguing that synthetic biology is too important to be left to scientists and business alone. This message was inspired by our publication, *SynBio Politics: bringing synthetic biology into debate*, which contended that the promises and implications of synthetic biology trigger sensitive questions, necessitating wider societal engagement. It's therefore timely, and hugely important, that SYNENERGENE takes up this challenge as a European mobilisation and mutual learning action plan. As Rathenau Instituut we are proud to be involved in this initiative and to be your host for this Forum.

This Forum brings together a diverse range of scientists, business people, policymakers and civil society organisations to engage in mutual learning about the societal implications of synthetic biology. It also addresses and involves a wider public by putting synthetic biology on stage, in a programme which includes a science café, a synbio theatrical debate, a society-meets-science event, and a BIO·FICTION evening film festival.

We would like to invite and challenge all of you to give sincere consideration to opportunities, both now and in the future, for responsible research and innovation in synthetic biology.

Dr. Melanie Peters
Director Rathenau Instituut



Forum Day 1: Conference – towards a synthetic biology agenda

08.15–09.00 Registration > first floor

Opening: Future visions of synthetic biology > Auditorium, floor 2

09.00–09.05 Opening by chair Melanie Peters, Director Rathenau Instituut

09.05–09.15 Christopher Coenen (KIT) in conversation with Rinie van Est (Rathenau Instituut): *Why are we here today?*

09.15–09.35 Koert van Mensvoort (Next Nature): *Recreating nature and society*

09.35–10.30 Four pitches on future visions of synthetic biology from:

- Marileen Dogterom (Bionanoscience TU Delft): *SynBio recreating life*
- Vitor Martins dos Santos (Systems & Synthetic Biology WUR): *SynBio recreating industry*
- Alfred Nordmann (Philosophy TU Darmstadt): *SynBio recreating biology*
- Oron Catts (SymbioticA): *SynBio recreating society*

10.30–11.00 Coffee & tea > Foyer, floor 2

11.00–12.30 Workshop round 1

- Synbio practices as RRI laboratory > Theater, floor 2
- Adaptive risk assessment in synthetic biology > Panorama room, floor 5
- Freedom and security in an age of synthetic biology: challenges, concerns, needs > Auditorium, floor 2

12.30–14.00 Lunch & RRI showcases > Foyer, floor 2

14.00–15.30 Workshop round 2

- Synthetic biology, culture and religion > Theater, floor 2
- Advanced biotechnologies for a responsible bio-economy > Panorama room, floor 5
- How to support RRI (in synthetic biology) through funding and science policy making? > Auditorium, floor 2

15.30–16.00 Coffee & tea > Foyer, floor 2

Closing debate: Towards responsible research and innovation in synthetic biology > Auditorium, floor 2

- 16.00–16.05 Introduction by Melanie Peters
- 16.05–16.30 Arie Rip (Science, Technology & Policy Studies University of Twente): *Challenges for responsible research and innovation*
- 16.30–17.45 Debating RRI in SynBio
Moderators: Melanie Peters and Armin Grunwald (KIT)
- Bernadette Bensaude-Vincent
 - Jane Calvert
 - Kenneth Oye
 - Sven Panke
 - Sascha Pohflepp
 - Arie Rip
 - Jim Thomas
- 17.45–18.00 Closing the day: Christopher Coenen in conversation with Dirk Stemerding (Rathenau Instituut)
- 18.00–19.00 Drinks & RRI showcases > Foyer, floor 2

Forum Day 2: Synthetic biology on stage

- 12.15–13.00 Registration > first floor
- 13.00–14.15 Science café: *Synbio vaccine engineering and its societal implications* > Theater, floor 2
- 14.30–15.30 Synbio futures on stage: *discover how you think* > Theater, floor 2
Workshop: *Vanilla-flavoured synthetic biology* > Foyer, floor 2
- 15.30–16.00 Coffee & tea > Foyer, floor 2
- 16.00–18.00 Debate: Civil society meets science > Theater, floor 2

Change of location to Mediamatic

- 20.00–22.00 Evening film programme with BIO·FICTION Amsterdam
- 22.00 Final Forum evening programme: Meet your RRI partners.

Day 1 – Workshop round 1

SynBio practices as RRI laboratory

11.00 – 12.30 > Theater, floor 2

This workshop explores different dimensions of RRI on the basis of experiences in the international Genetically Engineered Machine (iGEM) student competition and the CompuGene SynBio research project at TU Darmstadt. In our discussion of iGEM we focus on real-time technology assessment, prompting students to look at research from a societal point of view rather than a technological one. We also examine how the CompuGene project responds to the challenge of coming up against the limits of design. To what extent does CompuGene create a context for (social) learning? And what is the role of philosophers in the project?

Adaptive risk assessment in synthetic biology

11.00 – 12.30 > Panorama room, floor 5

Despite SynBio falling under current GMO safety assessment criteria, various expert groups have questioned how future innovations will challenge these criteria. This session will address a variety of themes, envisioning problematic SynBio technologies of the future, discussing the perceived urgency of new risk assessment strategies, and considering effective adaptive strategies for new or unknown risks. The audience will be presented with questions such as: “What are the pros and cons of technological containment solutions (safety by design)”, and “What can we learn from adaptive approaches in other domains?”.

Freedom and security in an age of synthetic biology: challenges, concerns, needs

11.00 – 12.30 > Auditorium, floor 2

Discussion about concerns and needs related to biosecurity challenges will be framed by a broader debate about biosecurity. In this debate the values of freedom and security are addressed against the background of scientific and technological advances, and new risks to democratic society and global political stability. This session will start with a series of short statements from the panel. The contributions of the panellists will be followed by questions or comments from participants, allowing more experts and stakeholders to join the debate.

Day 1 – Workshop round 2

Synthetic biology, culture and religion

14.00 – 15.30 > Theater, floor 2

This session will explore cultural and religious evaluations of, and attitudes towards, synthetic biology. Experts of philosophy, religion and history will each sit at a table. In six rounds, participants will be able to circulate, seated, around the room to learn, and discuss various topics. These include the relation of humans to nature, the role of technology in society, and the form, function and value of scientific progress. The session will conclude with a presentation of world views and religious attitudes towards synthetic biology, followed by a general discussion.

Advanced Biotechnologies for a Responsible Bio-economy

14.00 – 15.30 > Panorama room, floor 5

The bio-economy is steadily taking shape as a potential solution to many global challenges. This session aims to share insights into how the potential of advanced biotechnologies can be rooted in societal needs and values. On the basis of these insights, and with RRI as a guide, we seek to explore the desired outcomes of emerging bio-economies, and to reflect on the potential role of synthetic biology. The session brings together speakers with backgrounds in civil society organisations, industrial biotechnology, biotech start-ups, do-it-yourself biology, and RRI.

How to support RRI (in synthetic biology) through funding and science policymaking?

14.00 – 15.30 > Auditorium, floor 2

Taking as examples synthetic biology, and the life sciences and biotechnology more generally, this session will be dedicated to discussing the lessons learned in, and future perspectives of, science policymaking and funding with respect to responsible research and innovation (RRI). The discussion will include expertise from the US as well as from high-profile activities at EU level. The session will take the form of a panel discussion followed by a wider discussion among all participants.

Day 2 – Science cafe, workshop, debates

Science café: Synbio vaccine engineering and its societal implications

13.00–14.15 > Theater, floor 2

Mycoplasma is virtually resistant to all antibiotic interventions, and is currently causing problems in the livestock industry around the globe. MYCOSYNVAC is a European project devoted to combatting Mycoplasma by re-engineering the microorganism itself through synthetic biology. The project also goes beyond the technical, to address societal and ethical dimensions as well. The purpose of this science café is to present the role of synthetic biology in animal vaccine development in an interactive manner. It will engage the public and scientists – on an equal footing – to encourage questions, opinions, hopes and concerns.

Synbio futures on stage: discover how you think

14.30–15.30 > Theater, floor 2

This interactive theatrical debate brings citizens, stakeholders and actors together for a joint exploration of ideas and concerns about the societal future of synthetic biology. Actors play out semi-improvised scenes to demonstrate the future of potential SynBio applications. A facilitator takes the audience through an exploration of the opportunities and dilemmas they have witnessed on stage. By making the possible consequences of synthetic biology visible without judgment, this theatrical debate aims to create a space where participants can form their own opinions and discuss the issues freely.

Workshop: Vanilla-flavoured synthetic biology

14.30–15.30 > Foyer, floor 2

Sweets, perfumes, creams and many other products contain vanillin, the main molecule responsible for the vanilla aroma. Vanillin is traditionally extracted from plants, but there are alternative, more efficient ways to produce this molecule. One of the objectives of synthetic biology is greater efficiency in the production of molecules which are useful for environmental, nutritional and biomedical applications. This public engagement workshop aims to demonstrate and discuss the use of innovative synthetic biology techniques for the production of vanillin (maximum number of participants: 15).

Debate: Civil Society meets Science

16.00 – 18.00 > Foyer, floor 2

During this session we will discuss the “right” impacts of synthetic biology, bringing together a mixed group of stakeholders, including representatives from civil society organisations, a social scientist, an artist and – of course – synthetic biologists. Together with the audience they will discuss global challenges and the solutions proposed by synthetic biology. Is synthetic biology a helpful tool to address these challenges or a “techno-fix” with potentially negative implications, distracting us from real solutions? The debate is divided into two rounds, one about health challenges and one about sustainability challenges.

Day 2 – Evening programme with BIO·FICTION Amsterdam

A film programme and discussion, organised and hosted by Mediamatic in collaboration with Biofaction and other SYNERGENE partners.

20.00 > Mediamatic

Synthetic biology is a science which resides at a juncture. Not only a blend of biology, chemistry and engineering (among other disciplines), it is also a blend of science and fiction. But is it science fiction? It’s a science grounded in reality. But synthetic biology also deals with possibilities – in some cases in unusual and unforeseen ways.

The BIO·FICTION film programme brings together real synthetic biology with future possibilities mediated through a superb selection of short films. The screenings allow viewers to gaze into possible futures where synthetic biology plays a part in our daily lives, with surprising consequences. Many of the films address the moral challenge of applying synthetic biology to humans and other beings, challenging the viewer to think about its applications, as well as its ethical and social implications.

BIO·FICTION promises to be an entertaining evening, offering a host of new and creative ways to help shape public discussion about the possibilities of synthetic biology.



Keynote speaker Koert van Mensvoort

Koert van Mensvoort (1974) is an artist, technologist and philosopher best known for his work on the philosophical concept of Next Nature, which revolves around the idea that our technological environment has become so complex, omnipresent and autonomous that it is best perceived as a nature of its own. It is his aim to better understand our co-evolutionary relationship with technology and help set out a track towards a future that is rewarding for both humankind and the planet at large.

Among his works are the NANO Supermarket (a travelling exhibition disguised as a supermarket that presents speculative future technologies), the book "Next Nature: Nature changes along with us", the documentary "Daddy! The Woods smell of Shampoo", the Rayfish Footwear project (about a fictional company that creates bio-customised sneakers from genetically engineered stingray leather) and the In Vitro Meat Cookbook (exploring the potential impact of lab-grown meat on our food culture). Van Mensvoort directs the Next Nature Network in Amsterdam and is a fellow at Eindhoven University of Technology.

Speakers

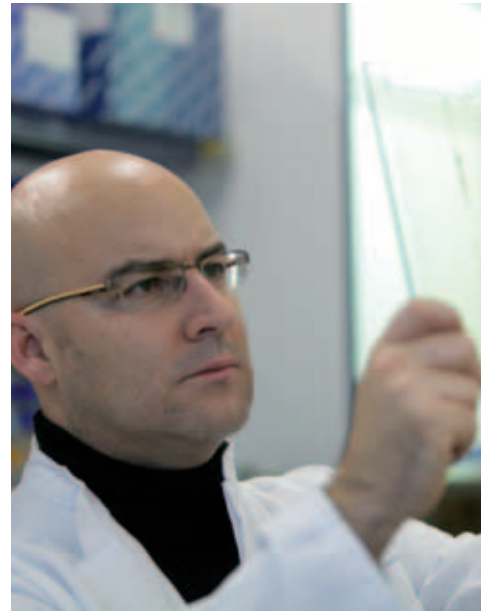
Marileen Dogterom

Marileen Dogterom was trained as a theoretical physicist at the University of Groningen. She was a PhD student in Paris and Princeton until 1994 and then a postdoc at Bell Labs. In 1997 she started her own independent research group in experimental biophysics at the FOM Institute AMOLF in Amsterdam, where she was a group leader and later department head until 2014. Since then she has been professor and chair of the department of Bionanoscience at the TU Delft. Her main interest is in the reconstitution of cellular machineries in artificial confinement, with the ultimate goal of building a synthetic cell.



Vitor Martins dos Santos

Vitor Martins dos Santos is the chair of Systems and Synthetic Biology at Wageningen University (WUR). Broadly, his research interests include bioinformatics, biotechnology and microbiology. As chair, prof. dos Santos oversees projects which attempt to elucidate underlying cellular mechanisms in microbes, such that they can be translated into applications in medicine, biotechnology and environmental work.





Alfred Nordmann

Alfred Nordmann is a philosopher of science and technoscience at TU Darmstadt and the University of South Carolina. With nanotechnology, converging technologies, and synthetic biology as his primary research fields, he studies how knowledge is produced and how a wide range of values enter into this process. For example, when synthetic biologists take as their motto “what I cannot create, I do not understand”, does that mean that they substitute the successful functioning of what they create for a theoretical understanding of what they do? What are the implications of this for science and society at large?



Oron Catts

Oron Catts is the Director of SymbioticA, The Centre of Excellence in Biological Arts, School of Anatomy, Physiology and Human Biology, The University of Western Australia. He is a Professor of Contestable Design at The Royal College of Arts, London, and a Visiting Professor at the School of Art, Design and Architecture, Aalto University, Helsinki. He is an award-winning artist, researcher and curator whose pioneering Tissue Culture and Art Project, which he established in 1996, is considered a leader in the field of biological art. In 2000, he co-founded SymbioticA at The University of Western Australia.



Keynote speaker Arie Rip

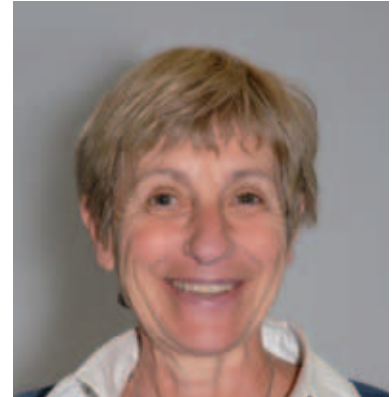
Arie Rip studied chemistry and philosophy at the University of Leiden, conducted research in physical chemistry, and then switched to teaching and research in Chemistry and Society, and in Science, Technology and Society studies more generally. He was guest professor of science dynamics at the University of Amsterdam (1984-1987), and then moved to the Philosophy of Science and Technology Chair at the University of Twente. For a time, he was visiting professor at the University of Stellenbosch, South Africa (1997-2009). After his retirement in 2006 he continued to work on constructive technology assessment (of nanotechnology and more generally), modes of knowledge production, and the future of science institutions, including universities and funding agencies.

Arie Rip has contributed to science policy studies and reports, and has carried out evaluation studies and foresight studies. He was a member of three EU High-Level Expert Groups on governance of science. He was Board Member of the European Network of Excellence PRIME (Policies for Research and Innovation in the Move towards the European Research Area), 2004-2009. He is now also involved in the discussion, and application, of Responsible Research and Innovation.

Panel members

Bernadette Bensaude Vincent

Bernadette Bensaude Vincent, a philosopher and historian of science and technology, is emeritus professor at Université Paris 1 Panthéon-Sorbonne. Her research topics include the history and philosophy of chemistry to bionanotechnology. Notable publications: *Chemistry. The Impure Science* (2008); *Les vertiges de la technoscience* (2009); *Fabriquer la vie. Où va la biologie de synthèse* (2011).



Jane Calvert

Jane Calvert is a Reader in Science, Technology and Innovation Studies at the University of Edinburgh. Her research focuses on attempts to engineer living things in the emerging field of synthetic biology. She is also interested in the governance of emerging technologies, and in interdisciplinary collaborations of all sorts.



Kenneth Oye

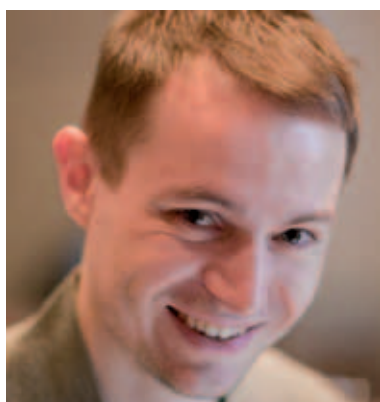
Kenneth Oye is Director of the MIT Programme on Emerging Technologies. His studies on regulating gene drives and yeast-based opiates, assessing synthetic biology environmental effects and technical safeguards, and adaptive pharmaceuticals policies, appear in *Science*, *Nature* and *CP&T*. He directs Policy and Practices in NSF SynBERC, and chairs iGEM and MIT-Broad Biofoundry safety committees.





Sven Panke

Sven Panke is a Bioprocess Engineer at ETH Zurich. He was trained at the German National Research Center for Biotechnology in Braunschweig, the Centro de Investigaciones Biologicas in Madrid, and the ETH Zurich. Before returning to ETH, he worked for two years for the Dutch Chemical Company DSM.



Sascha Pohflepp

Sascha Pohflepp is a German-born artist and researcher. Exhibitions include Talk To Me (MoMA), Hyperlinks (Art Institute of Chicago), Micro Impact (Boijmans Van Beuningen Museum) and Åzone Futures Market (Solomon R. Guggenheim Museum). Sascha has earned two Honorary Mentions from the VIDA Awards and was shortlisted for the Berlin Art Prize (2015).



Jim Thomas

Jim Thomas is Programme Director with ETC Group, an international civil society organisation that tracks corporate concentration and the impact of emerging technologies on the marginalised and on biodiversity. Jim sits on the UN CBD's Ad Hoc Technical Expert Group on Synthetic Biology and helps co-ordinate Synnergene's Civil Society Forum activities.

Organisation



Christopher Coenen

Christopher Coenen is SYNENERGENE's Coordinator, leading, together with Harald König and Steffen Albrecht, the Coordination team at KIT-ITAS where he is a senior researcher, and involved in projects on SynBio since the mid-2000s. He is editor-in-chief of 'NanoEthics' (Springer).



Dirk Stemerding

Dirk Stemerding is Senior Researcher Technology Assessment at the Dutch Rathenau Instituut. He co-authored the study "Getting to the core of the bio-economy: a perspective on the sustainable promise of biomass" (Rathenau Instituut 2011). He led a work package on synthetic biology in the European project, Global Ethics in Science & Technology (GEST 2011-2014), and was an editor of "Science and Technology Governance and Ethics: a global perspective from Europe, India and China" (Springer 2015). Currently, Dirk is a work package leader in SYNENERGENE, the four-year European Mobilisation and Mutual Learning Action Plan promoting responsible research and innovation in synthetic biology (2013-2017).

The Rathenau Instituut and synthetic biology: a ten year journey

Ten years ago, the Rathenau Instituut published *Constructing Life. Early Social Reflections on the Emerging Field of Synthetic Biology*. It was one of the first contributions to an emerging international debate about the promises and implications of synthetic biology. Since then, we have seen growing debate in the field, addressing risk and regulation, access and ownership of knowledge, and the broader socio-economic and ethical issues around synthetic biology. These discussions have been shaped, particularly in the US and Europe, by numerous reports and position statements issued by ethical committees, learned societies, governmental bodies and civil society organisations. The Rathenau Instituut has continued to make its own contributions, often as a partner in European projects, reflecting on synthetic biology and its political and societal ramifications. These contributions can be seen as part of an international tradition of technology assessment (TA), including studies of the ethical, legal and social implications of science and technology (ELSI).

In this context, a shift has taken place over the past ten years from different modes of TA to what is now known as *responsible research and innovation* (RRI). What does this shift entail? Where TA focusses on the envisaged products of innovation and their potential impacts, RRI aims to move the conversation away from the products of innovation towards its purposes and motivations. Inspired by this shift, the Rathenau Instituut and its partners in SYNENERGENE have engaged with iGEM students and researchers in the synbio field, stimulating them to think more deeply about “what we want from innovation”. This is not to say, of course, that the products and impacts of innovation don’t matter. The real challenge of RRI is to create processes and spaces bringing together innovators and societal actors with the aim to critically address both societal needs and opportunities for innovation.

About Synenergene

SYNERGENE is an EU-funded 'Mobilisation and Mutual Learning Action Plan', involving nearly thirty parties from all over Europe. It contributes to establish conditions for responsible research and innovation (RRI) in synthetic biology.

The SYNERGENE project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 321488.

www.synenergene.eu



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