

# Call for Proposals

## Solar-Driven Chemistry 2021/2022

International call for applications in chemistry and process engineering

AKA (Finland), ANR (France), DFG (Germany), NCN (Poland), SNSF (Switzerland) and Tübitak (Turkey) are launching together a new call in the field of solar-driven chemistry: Solar-Driven Chemistry 2. After the first round in 2019/2020, this is the second solar-driven chemistry joint call.

In natural photosynthesis, carbon dioxide is converted into complex chemical compounds by using sunlight (photons) as the energy source. Solar energy is thus stored in chemical bonds. Developing technical processes for the direct conversion of solar energy into chemical compounds by means of artificial compounds, using universally available raw materials such as carbon dioxide and/or water, is a scientific and technical "grand challenge" with tremendous societal impact. Such an approach does not rely on low-carbon electricity from traditional or renewable energy sources, as the photons arriving at the earth are directly used for (photo-) chemical processes, and no intermediate storage or transfer of electricity is needed.

Although the topic is not new and feasibility of several solar-driven chemical approaches has been demonstrated on a laboratory scale, this is still a visionary goal where many fundamental scientific questions have to be answered before it can be implemented on a meaningful technical scale along the value chain. Non-exclusive examples of associated fundamental research for the photochemical conversion of small molecules into valuable products are: development and improvement of methods and materials for light harvesting and stable (photo-)catalysts, both based on commonly available raw materials, development of analytical, theoretical and computational tools to understand the thermodynamics and to predict the reactivity of such materials, understanding of energy transfer and conversion processes in de novo designed man-made organic and inorganic materials, etc.

Subject of this call for proposals is fundamental research in all sub-areas relevant to the photochemical transformation of small, abundant molecules, such as carbon dioxide, water or nitrogen, into more valuable, storable chemicals by means of solar radiation. Focus of the proposals should be on the photochemical processes (reactions) and on solving fundamental problems. Typical (but not exclusive) examples include preparative, physicochemical, analytical and theoretical work (always related to the general call topic) on

- Research on light-converting/harvesting and charge separation issues, catalytic, electrode, membrane, etc. materials
- Materials science and development (including high-throughput computing, 'materials by design' approaches, advanced characterization and in situ / operando measurements methodologies) to address performance, stability and sustainability, as long as they are used for the photochemical conversion of small molecules
- Investigating fundamental mechanisms of catalysis, including bio-inspired, enzymatic, molecular and inorganic catalysis (understand, design and benchmark selective, fast, energy-

efficient, stable and O<sub>2</sub>/poison-tolerant catalysts) and light harvesting, if focus is on photochemical conversion of small molecules

- Heterogeneous photoelectrochemistry/photocatalysis (including surface-confined molecular systems)
- Photo(electro)catalytic water splitting
- Photochemical or photoelectrochemical CO<sub>2</sub> reduction (including combined CO<sub>2</sub> capture and conversion for instance)
- Development of new photoactive systems if related to the general call topic
- Reaction engineering, engineering of photoreactors and related multiscale-multiphysics approaches
- Molecular model systems capable of direct conversion, e.g. for mechanistic studies
- Photocatalytic conversion of organic substrates using O<sub>2</sub>, H<sub>2</sub>O and CO<sub>2</sub> without sacrificial electron donor/acceptor
  
- The following topics are excluded from the call:
  - Genetic engineering of plants for this purpose
  - Conversion by living organisms
  - Biomass conversion
  - Improvement or scale-up of known technologies, such as Fischer-Tropsch, methanol, hydrogen or syngas technologies, water electrolysis, etc., unless completely new catalysts are being developed
  - Optimization of established (photo)catalytic systems
  - Standard photocatalytic reactions (e.g., catalytic reactions using UV radiation)
  - Thermal processes driven by solar energy (e.g. by concentrating solar power technologies etc.)
  - CO<sub>2</sub> concentration and storage

Researchers who are eligible to apply for financial support from any of the participating funding organisations are cordially invited to apply jointly within the subject of this call. A list of the respective organisations including contact details is given below. Joint proposals can be submitted by **at least two and up to four Partners eligible to funding organisations from at least two and up to four different countries participating in this call**; special rules apply for certain combinations, please check the information in the appendix section of this document, the “call websites” and additional documentation of the respective participating organisations below for further information.

Consortia that already received funding in the first call 2019/2020 are not eligible to apply for a second funding period. Changing the consortium by adding or substituting at least one of the Principle Investigators, leading to a significant topical change of the proposal is mandatory. Proposals that did not receive funding in the first call 2019/2020 can be re-submitted, if revised.

Each applicant is only allowed to participate in one application within this call.

The projects must comprise novel and ambitious ideas in the subject area of this call. The scientific level of the projects should be high in international comparison. Although the scientific quality of the proposals is the decisive criterion, joint projects must also demonstrate a clear added value to the applicants' cooperation over and above what could be achieved individually.

There will be a two-stage submission and evaluation procedure involving pre-proposals and full proposals. The DFG acts as Call Secretariat, therefore all pre-proposals and full proposals must be

submitted to DFG's "elan" submission system. All pre-proposals must be submitted no later than Friday, **29 October 2021** (23:59 CET). Please note that all applicants need to be registered in the "elan" system. The confirmation of the registration takes about three working days; please register on Monday, 25 October 2021 the latest!

Successful applicants from the pre-proposal stage will be invited approximately early February 2022 to submit their full proposals no later than **2 May 2022**.

In the full proposal phase, each applicant may request funding for individual grants according to national rules and national general conditions; for further details see the respective "call websites" below. Joint projects will be funded up to three years (either 24 or 36 month) starting not later than beginning of 2023. Full proposals must include the project description, justification of the requested budget, CVs and track record of all applicants. Additional documents might be requested by each funding organisation. Detailed information, a template and list of required documents will be provided to the pre-proposals invited to participate to the second stage.

The evaluation criteria are as follows:

- scientific background: CV, track record, quality of publications and capability for independent scientific work of all applicants in relation to their scientific age
- research proposal: added value of cooperation, originality and novelty of the idea, innovative value and scientific impact of research subject
- feasibility of the project: feasibility of the work plan, risk involved, choice of methods, tools, instrumentation, capability of the applicant's institutions to provide scientific infrastructure for their proposed research

The review process for both stages will be conducted by a Review Panel consisting of international experts.

## Further Information

Information on the submission of pre-proposals can be found here:

[www.dfg.de/download/pdf/foerderung/info\\_wissenschaft/2021/call\\_solar\\_driven\\_chemistry\\_guidelines.pdf](http://www.dfg.de/download/pdf/foerderung/info_wissenschaft/2021/call_solar_driven_chemistry_guidelines.pdf)  
[www.dfg.de/download/pdf/foerderung/info\\_wissenschaft/2021/call\\_solar\\_driven\\_chemistry\\_budget\\_form.rtf](http://www.dfg.de/download/pdf/foerderung/info_wissenschaft/2021/call_solar_driven_chemistry_budget_form.rtf)

The elan system can be accessed at:

<https://elan.dfg.de/en>

DFG's Data protection notice on research funding:

Please note the DFG's data protection notice on research funding, which can be viewed and downloaded at [www.dfg.de/privacy\\_policy](http://www.dfg.de/privacy_policy). If necessary, please also forward this information to those individuals whose data will be processed by the DFG due to their involvement in your project.

Participating organisations, contact persons and call websites:

Finland: Suomen Akatemia (AF)

Science Adviser Minna Räisänen, [minna.raisanen@aka.fi](mailto:minna.raisanen@aka.fi)

Science Adviser Hanne Laine-Kaulio, [hanne.laine-kaulio@aka.fi](mailto:hanne.laine-kaulio@aka.fi)

[International joint call: Solar-Dr - Academy of Finland \(aka.fi\)](http://International joint call: Solar-Dr - Academy of Finland (aka.fi))

France: Agence National de la Recherche (ANR)

Dr. Pascal Bain, [pascal.bain@anr.fr](mailto:pascal.bain@anr.fr)

Dr. Mélanie Lorion, [Melanie.Lorion@anr.fr](mailto:Melanie.Lorion@anr.fr)

<https://anr.fr/solar-driven-chemistry-2021>

Germany: Deutsche Forschungsgemeinschaft e.V. (DFG)

Dr. Kerstin Freitag, [kerstin.freitag@dfg.de](mailto:kerstin.freitag@dfg.de)

[www.dfg.de/info\\_wissenschaft/solardrivenchemistry](http://www.dfg.de/info_wissenschaft/solardrivenchemistry)

Poland: Narodowe Centrum Nauki (NCN)

Przemyslaw Puchala, – International Cooperation Officer, [Przemyslaw.Puchala@ncn.gov.pl](mailto:Przemyslaw.Puchala@ncn.gov.pl)

Dr. Tomasz Szumelda – Coordinator for Physical Sciences and Engineering, [Tomasz.Szumelda@ncn.gov.pl](mailto:Tomasz.Szumelda@ncn.gov.pl)

<https://ncn.gov.pl/wspolpraca-zagraniczna/wspolpraca-wielostronna/solar-driven-chemistry>

Switzerland: Swiss National Science Foundation (SNSF)

Dr. Stephan Cludius-Brandt, [stephan.cludius@snf.ch](mailto:stephan.cludius@snf.ch)

[Open calls \(snf.ch\)](https://www.snf.ch/en/open-calls)

Turkey: TÜRKİYE BİLİMSEL VE TEKNOLOJİK ARAŞTIRMA KURUMU (TÜBİTAK)

Dr. Zeynep Arziman, [Zeynep.arziman@tubitak.gov.tr](mailto:Zeynep.arziman@tubitak.gov.tr)

<https://www.tubitak.gov.tr/tr/node/16558>

<https://www.tubitak.gov.tr/tr/kurumsal/uluslararası/cok-tarafli-programlar/solar/icerik-solar-gunese-dayali-kimya>

For questions relating to the online application system:

Call Secretariat: DFG, Germany

Proposal submission: Brigitte Engelmann, phone +49 228 885-2769, [brigitte.engelmann@dfg.de](mailto:brigitte.engelmann@dfg.de)

General questions: Dr. Kerstin Freitag, phone +49 228 885-3084, [kerstin.freitag@dfg.de](mailto:kerstin.freitag@dfg.de)

## Appendix

### Guidelines for applicants to AKA:

In general, the conditions and restrictions on Academy Projects apply to the funding. Academy of Finland applies the full cost model in its funding, and the Academy's funding contribution for a project can come to no more than 70% of the total project costs. Funding can be granted to research teams for purposes of hiring scientific staff, for the acquisition of equipment and supplies, and for other expenses arising for instance from researcher mobility and networking activities. The PI's salary costs must not be significant in relation to the project's total costs. For example, a three-year research project must not include more than 4,5 months of the PI's effective working hours. This is equivalent to about 1,5 months a year. Finnish partners of projects that have been successful at the second call stage will be invited to submit national application forms at the end of 2022. The Finnish partners have to agree in writing with the other project partners on the rights of ownership and use of the research results of the project as soon as possible after the funding decision has been made. Project partners have to clarify the rights and obligations of inventors with the other members of their research team as well as with their research partners and funding bodies.

More information on the Academy's general conditions and guidelines for funding:

[How to use funding - Academy of Finland \(aka.fi\)](https://www.aka.fi)

Guidelines for research project funding granted by the Research Council for Natural Sciences and Engineering:

<https://www.aka.fi/en/about-us/decision-making-bodies/research-councils/research-council-for-natural-sciences-and-engineering/>

We expect to fund ca. 3 projects with 1 million euros reserved for this call. The maximum amount of funding applied from the Academy of Finland is 330 000 euros per consortium partner and 450,000 euros per consortium if there are two partners from Finland.

In doubt, researchers are strongly encouraged to contact the Academy of Finland's contact person.

### Guidelines for applicants to ANR:

Applicants must consult the Appendix for ANR applicants (*Modalités de participation pour les partenaires sollicitant une aide de l'ANR*) on the ANR website, which features the relevant terms and conditions, applicable rules, as well as **additional application modalities** to this call. The appendix is available at the following address: <https://anr.fr/solar-driven-chemistry-2021>

Applicants must strictly adhere to all set conditions. In case of doubt, they are strongly encouraged to contact the ANR contact point.

Please note that the following combinations are excluded, due to already existing possibilities: German-French combinations and Swiss-French combinations.

### Guidelines for applicants DFG:

This initiative covers the subject areas of DFG review boards/Fachkollegien 321-327.

As DFG offers already the possibility for bilateral proposals with some of the partners, interested applicants are referred to the respective bilateral submission possibilities. See details for the French-German annual calls, Polish-German and Swiss-German permanent submission opportunities below.

These bilateral combinations are not eligible to apply within this call. Bilateral Finnish-German or Turkish-German proposals and any trilateral or quadrilateral proposals with German participation are allowed within this call.

The usual eligibility regulations for DFG programmes for individual funding apply. In doubt, researchers are strongly encouraged to contact the German contact point.

Details on the bilateral combinations:

French-German annual call:

[DFG, German Research Foundation - French-German Collaboration for Joint Projects in Natural, Life and Engineering \(NLE\) Sciences](#)

Swiss-German permanent submission opportunity:

[DFG - Deutsche Forschungsgemeinschaft - Antragstellung mit europäischen Kooperationspartner/-innen \(im Weave Lead Agency-Verfahren\)](#)

Polish-German submission opportunity:

Planning provides for Weave to be implemented with NCN (Poland) later in 2021. An announcement can prospectively be expected mid-September 2021

[DFG, German Research Foundation - Proposal Submission with European Cooperation Partners \(Weave Lead Agency Process\)](#)

### Guidelines for applicants to NCN:

National eligibility requirements for applicants requesting NCN funding are given in the *Annex to National Science Centre (NCN) Council's Resolution No 137/2020 on awarding funding for research tasks funded or co-funded under international calls launched by the National Science Centre and carried out as multilateral collaboration UNISONO*. [version in EN](#); [version in PL](#).

Only proposals involving **basic research** (experimental or theoretical endeavours undertaken to gain new knowledge of the foundations of phenomena and observable facts, without any direct commercial use) may be submitted in response to this Call for proposals.

Polish applicants may apply for funding to cover salaries for members of the research team, salaries and scholarships for students and PhD students, purchase or construction of research equipment and for other costs crucial to the research project. We recommend that Polish applicants should consult the budget table of the Polish part of the project with the NCN. Please follow the rules provided in the NCN announcement of the Call (section: *How should the Polish budget be planned?*).

Indirect costs may not exceed 20% of direct costs. Additionally, indirect costs of up to 2% of direct costs may be spent on open access to publications and/or research data.

The costs of consultations and visits of collaborators from foreign research institutions that receive parallel funding of their research projects from partner agencies co-launching an international call are not deemed eligible in NCN proposals.

The total funding allocated by the NCN for research tasks performed by the Polish research teams in the Call is 500,000 EUR.

Applicants must strictly adhere to all conditions provided in the NCN Call announcement and Call documents. In case of doubt, please contact us.

Bilateral cooperation must not be planned by research teams from Poland and Germany only or from Poland and Switzerland only. Researchers interested in such cooperation are advised to read the [Weave-UNISONO](#) Call portfolio.

More information can be found here:

<https://ncn.gov.pl/wspolpraca-zagraniczna/wspolpraca-wielostronna/solar-driven-chemistry>

#### **Guidelines for applicants to SNF:**

Projects must comply with the SNSF Regulations on project funding (Division II). In particular, all applicants and co-applicants from Switzerland must be eligible for the funding scheme “project funding” of the SNSF.

Partners of the international project consortium who submit grant applications to funding agencies other than the SNSF cannot be declared as project partners within the meaning of article 11.2 of the SNSF Funding Regulations. They should be declared as consortium partners instead and apply for funding at their respective research funding organisations.

Article 17 of the SNSF Funding Regulations only applies in that proposals with overlapping funding periods are only approved if the research projects in the context of this call pursue different goals from any ongoing projects by the same applicants.

Article 7.3 of the SNSF Regulations on project funding applies. Swiss applicants may participate in at the most one “Solar-driven chemistry” proposal.

Grants will be managed according to the Lifetime Management Guidelines for research projects. No follow-up applications are possible.

#### **Guidelines for applicants to TÜBİTAK:**

Applicants must consult the national rules for TÜBİTAK

([https://www.tubitak.gov.tr/sites/default/files/3125/solar\\_2021\\_surec\\_dokumani.pdf](https://www.tubitak.gov.tr/sites/default/files/3125/solar_2021_surec_dokumani.pdf)) at the TÜBİTAK website. All Turkish applicants are strongly encouraged to contact the TÜBİTAK contact point.

National applications will be completed through the <https://uidb-pbs.tubitak.gov.tr/> system. National applications are accepted only with e-signature. For detailed information about the e-signature application process: [https://www.tubitak.gov.tr/sites/default/files/281/ardeb\\_e-imza\\_yardim\\_dokumani.pdf](https://www.tubitak.gov.tr/sites/default/files/281/ardeb_e-imza_yardim_dokumani.pdf). For your questions and suggestions about the electronic signature, you can send an e-mail to [ardeb.e-imza@tubitak.gov.tr](mailto:ardeb.e-imza@tubitak.gov.tr).

Further information about the call can be found at the TÜBİTAK call website:

<https://tubitak.gov.tr/tr/kurumsal/uluslararasi/cok-tarafli-programlar/solar/icerik-genel-bilgi>