

# CALL FOR APPLICATIONS

## Solar-driven chemistry

14 December 2018



## ACADEMY OF FINLAND

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# Solar-driven chemistry 2019/2020

## International call for applications Chemistry and Process Engineering

### Background

Solar-Driven Chemistry is a network initiated by the German Research Foundation - Deutsche Forschungsgemeinschaft (DFG) with an aim to conduct a pilot international call for proposals in the field of solar-driven chemistry. The initiative involves research funding agencies from Finland, France, Germany, Poland and Switzerland.

### Scope of the 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, catalytic, electrode, membrane, etc. materials
- Materials issues (e.g. photochemical stability of relevant materials), as long as they are used for the photochemical conversion of small molecules
- Investigating mechanisms of catalysis and light harvesting, if focus is on photochemical conversion of small molecules
- Heterogeneous photoelectrochemistry/photocatalysis
- Photocatalytic water splitting
- Photochemical or photoelectrochemical CO<sub>2</sub> reduction
- Development of new photoactive systems if related to the general call topic
- Reaction engineering
- Molecular model systems capable of direct conversion, e.g. for mechanistic studies



**The following topics are excluded from the call:**

- Conversion by living organisms and biocatalysts (enzymes, etc.) unless the biocatalysts are used in combination with a synthetic catalyst
- 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
- Thermal processes driven by solar energy (e.g. by concentrating solar power technologies etc.)
- CO<sub>2</sub> concentration and storage
- Reactor design
- Standard photocatalytic reactions (e.g., catalytic reactions using UV radiation)
- Genetic engineering of plants for this purpose
- Biomass conversion

**General eligibility**

Researchers who are eligible to apply for financial support from any of the participating funding organizations are cordially invited to apply jointly within the subject of this call. A list of the respective organizations including contact details is given below. Joint proposals can be submitted by **at least two and up to four applicants located in at least two and up to four different countries (Finland, France, Germany, Poland, Switzerland)**; special rules may apply for certain combinations, please check the “call websites” of the respective participating organizations below for further information.

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

**Evaluation process and criteria**

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 procedure involving pre-proposals and full proposals. The review process for both stages will be conducted by a Review Board consisting of international experts.

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 Wednesday, 13 February 2019 at 23:59 CET.** Please note that all applicants need to be registered in the “elan” system. The confirmation of the registration takes about 3 working days; **please register on Friday, 8 February 2019 the latest!**

Successful applicants from the pre-proposal stage will be invited approximately mid-June 2019 to submit their full proposals **no later than 31 July 2019 at 23:59 CET.** 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:

- Research proposal: originality and novelty of the idea, innovative value and scientific impact of research subject, added value of cooperation.
- 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.
- Scientific background: CV, track record, quality of publications and capability for independent scientific work of all applicants in relation to their scientific age.

### Funding

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 for three years starting not later than spring 2020.

### Special rules for applicants from Finnish research organisations

**In general, the conditions and restrictions on Academy Projects apply to the funding.** The Academy 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. 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:

<http://www.aka.fi/en/funding/how-to-use-the-funding/general-conditions-and-guidelines-for-funding/>

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

<http://www.aka.fi/en/funding/how-to-apply/application-guidelines/research-council-policies/policies-of-research-council-for-natural-sciences-and-engineering/>

We expect to fund 3-4 projects with €1m reserved for this call. The maximum amount of funding per project is 450,000 euros.

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

### Further information

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

[www.dfg.de/download/pdf/foerderung/info\\_wissenschaft/2018/call\\_solar\\_driven\\_chemistry\\_guidelines.pdf](http://www.dfg.de/download/pdf/foerderung/info_wissenschaft/2018/call_solar_driven_chemistry_guidelines.pdf)

## Participating organisations and contact points

**Finland:** Academy of Finland (AKA)

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

Call website: <https://www.aka.fi/fi/rahoitus/rahoitusmahdollisuudet/akatemia-lahihaut/kansainvalinen-yhteisrahoitteinen-haku-solar-driven-chemistry-sdc--tutkimusohjelma/>

**France:** Agence National de la Recherche (ANR)

Contact: Dr. Olivier Spalla, e-mail: [olivier.spalla@anr.fr](mailto:olivier.spalla@anr.fr); Dr. Aurélie Paquirissamy, e-mail: [aurelie.paquirissamy@anr.fr](mailto:aurelie.paquirissamy@anr.fr)

Call website: <http://anr.fr/Solar-dChemistry-2019>

**Germany:** Deutsche Forschungsgemeinschaft e.V. (DFG)

Contact: Dr.-Ing. Georg Bechtold, e-mail: [Georg.bechtold@dfg.de](mailto:Georg.bechtold@dfg.de)

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

**Poland:** Narodowe Centrum Nauki (NCN)

Contact: Dr Marta Buchalska, [marta.buchalska@ncn.gov.pl](mailto:marta.buchalska@ncn.gov.pl), tel. +48 12 341 9158, Marlena Wosiak, e-mail: [marlena.wosiak@ncn.gov.pl](mailto:marlena.wosiak@ncn.gov.pl), tel. +48 12 341 9093

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

**Switzerland:** Swiss National Science Foundation (SNSF)

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

Call website: <http://www.snf.ch/de/foerderung/ausschreibungen>

### For questions relating to the “elan” online application system:

Call Secretariat: DFG, Germany

Contact:

Proposal submission: Agnes Küster, e-mail: [agnes.kuester@dfg.de](mailto:agnes.kuester@dfg.de), tel. +49 228 885 2298

General questions: Dr.-Ing. Georg Bechtold, e-mail: [Georg.bechtold@dfg.de](mailto:Georg.bechtold@dfg.de)

