

National Science and Technology Council
Department of Natural Sciences and Sustainable Development
Chemistry Discipline
2027 TORCH-Chem
Taiwan Original Research for Chemical Horizons
Pilot Call for Proposals

Program Rationale and Objectives

The TORCH-Chem program is designed to support researchers who are prepared to address important and forward-looking scientific questions in chemistry. It provides support for exploratory research involving substantial scientific uncertainty and high potential impact, with the goal of fostering original chemistry originating in Taiwan with international academic influence. Applicants are encouraged to begin with a fundamental question: what new chemistry should Taiwan be able to create and lead in the years ahead? Building on sustained expertise and established research foundations, applicants are expected to propose original, forward-looking, and extensible research ideas that may lead to new scientific concepts, methodological frameworks, research tools, or platforms, while strengthening Taiwan's capacity to formulate important scientific questions and define new research directions.

TORCH-Chem places primary emphasis on fundamental scientific questions and the originality of the underlying ideas. Near-term application, product development, or immediate commercialization is not required. The program encourages researchers to pursue questions involving substantial uncertainty, particularly those with the potential to alter current scientific understanding or define new directions for research. Research outcomes should also provide a basis for subsequent work through concepts, methods, tools, platforms, or knowledge frameworks that can be tested, extended, adopted, or further developed by other researchers.

Scope of Support

The TORCH-Chem program invites exploratory research proposals centered on fundamental questions in chemistry. The program covers all major subfields of chemistry and interdisciplinary research with a clearly defined chemical basis, including but not limited to organic and inorganic chemistry, synthetic chemistry, materials chemistry, physical chemistry, analytical chemistry, biochemistry, theoretical and computational chemistry, energy and sustainable chemistry, nanochemistry and interfacial chemistry, chemical biology, and other research areas closely related to core chemical questions.

Proposed research may focus on new concepts, principles, mechanisms, reaction pathways, analytical methods, materials or molecular systems, as well as the development of new research tools

or methodological frameworks. Applicants should clearly define the key scientific question to be addressed, articulate the originality and pioneering nature of the proposed work relative to existing research, and describe its potential for subsequent development. Beyond advances in a single research problem, the program encourages outcomes with broader extensibility and utility, allowing the resulting concepts, methods, tools, platforms, or knowledge frameworks to be applied to other research questions and further adopted, tested, or developed by the research community, thereby enabling new research directions or methodological frameworks.

Guidance for Preparing the Concept Proposal and Full Proposal

TORCH-Chem provides small-scale support for exploratory research focused on the formulation and initial investigation of important scientific questions. Proposed research should address the key elements needed to determine whether the underlying concept warrants further development. Applicants are not expected, at the application stage, to present a complete large-scale research program or a plan for commercialization.

Applicants are encouraged to begin by considering what new chemistry Taiwan will need for the future, including new concepts, substances, reactions, methods, or research tools that may be required to advance chemical knowledge, academic development, and research capabilities. Proposals should be developed with reference to the following considerations:

- (1) **Research Vision and Scientific Direction:** Describe the scientific direction that the proposed research seeks to establish and its significance for the future development of chemical knowledge, research methodologies, or critical research capabilities in Taiwan. The scientific significance of the proposed research should be clearly explained.
- (2) **Core Chemical Question and Original Concept:** Define the core chemical question to be addressed and describe the limitations of existing theories, methods, or research frameworks. Explain the new hypothesis, concept, or research approach proposed in this study. Originality should arise from the scientific question or underlying research concept, rather than solely from material substitution, experimental adjustment, or incremental improvement of existing work.
- (3) **Core Hypothesis and Exploratory Research Plan:** Present the central hypothesis to be investigated at this stage and describe the associated research methods, key tasks, and the evidence expected to be obtained. The research plan should focus on the critical elements needed to assess the validity and potential of the proposed concept, while identifying major uncertainties, foreseeable difficulties, and possible directions for adjustment.
- (4) **Anticipated Scientific Breakthroughs and Future Development:** Describe the anticipated scientific breakthroughs and their contributions to chemical knowledge, research methodologies, or the development of the field. Applicants should also explain the potential for further development and expansion, and whether the resulting concepts, methods, tools, platforms, or knowledge frameworks may be adopted, extended, or further developed by other researchers.

Review Criteria

The review will focus on the chemical core and scientific significance of the proposed research, its originality, research foundation, and overall research plan. Although TORCH-Chem supports exploratory research involving substantial uncertainty, proposals should still be grounded in a sound scientific basis and present an appropriate research strategy, stage-specific objectives, and reasonable approaches to risk management. The review criteria are as follows:

- (1) **Chemical Core and Scientific Significance:** Whether the core chemical question is clearly defined and has scientific significance, forward-looking value, and relevance to the development of chemistry.
- (2) **Originality and Pioneering Potential:** The extent to which the proposed research differs from existing work and introduces new perspectives, concepts, methods, or research directions.
- (3) **Core Capabilities and Research Foundation:** The extent to which the applicant's prior research experience, technical capabilities, theoretical foundation, and scientific expertise provide an appropriate basis for conducting the proposed research.
- (4) **Extensibility and Potential for Community Adoption:** The potential for the research outcomes to be extended, adopted, or further developed in subsequent studies, and their potential influence on related research fields.
- (5) **Research Strategy and Stage-Specific Objectives:** The appropriateness of the proposed research pathway, stage-specific objectives, risk management, and plans for adjusting the research direction, as well as the potential to generate meaningful scientific findings and academic value.

Application Procedures for the Concept Proposal and Full Proposal

Applications will proceed in two stages: the Concept Proposal and the Full Proposal.

- (1) **Project Type:** Individual research project.
- (2) **Applicant Eligibility:** Applicants must meet the eligibility requirements specified in the NSTC Guidelines for Research Project Grants.
- (3) **Project Duration:** Each project should be planned over a four-year period, comprising an initial two-year exploratory phase followed by a two-year extended development phase. The first two years will be approved for implementation following review. Upon completion of the exploratory phase, only projects that pass a midterm evaluation will proceed to the subsequent two-year extended development phase.
- (4) **Funding Scale:** During the initial two-year exploratory phase, support will be provided on a small-scale basis, with annual funding of approximately NT\$1.5 million per project. Funding for the subsequent two-year phase may be adjusted based on the midterm evaluation and research scale, to support further development, expansion, or necessary research integration.
- (5) **Application Format:**
 1. Concept Proposal: limited to four pages, using the prescribed format provided in the Appendix.
 2. Full Proposal: should follow the format of the NSTC Research Project Proposal. Applicants should take into account the review comments on the Concept Proposal, respond to the

relevant scientific questions and recommendations, and refine the research plan accordingly.

(6) Application Schedule:

1. Concept Proposal: Applications must be submitted online by [2026/10/11] through the NSTC application system under “Research Project / TORCH-Chem Concept Proposal” in accordance with the procedures provided in Appendix II. Submission is complete once the online application has been formally submitted. Review results will be announced separately.
2. Full Proposal: Applicants whose Concept Proposals are approved should submit the Full Proposal together with the 2027 NSTC annual call for Research Project Grants. The submission deadline and procedures shall follow the relevant NSTC regulations for the 2027 Research Project Grant call.

Review and Funding Decision

- (1) The review process will be conducted in accordance with the NSTC regulations governing research project review procedures and the selection of reviewers.
- (2) Concept Proposals will first undergo a paper-based review according to the Review Criteria specified in this announcement. Applicants may subsequently be invited to give a presentation and participate in a discussion. Concept Proposals that receive sufficiently strong support through the paper-based review may be approved without a presentation.
- (3) Full Proposals will be evaluated based on the review comments from the Concept Proposal stage, the completeness of the research plan, funding requirements, feasibility, stage-specific objectives, and anticipated scientific contributions.
- (4) Approved projects will be funded for the initial two-year exploratory phase based on the review results and available annual budget. Before the end of this phase, the project will undergo a midterm evaluation considering research progress, clarification of key scientific questions, important findings, adjustments to the research direction, and potential for further development. The outcome of this evaluation will determine whether the project proceeds to the subsequent two-year extended development phase and the corresponding level of funding.

Project Implementation and Evaluation

- (1) Funded projects shall be carried out in accordance with the approved research plan. Principal investigators shall submit research progress reports, final research reports, and financial statements as required by NSTC regulations.
- (2) Principal investigators shall submit progress reports as required and participate in research symposium meetings organized by the Department. These meetings will address research progress, important findings, key scientific issues, and subsequent research plans. Experts may be invited to provide scientific comments and advice, which may be taken into account in monitoring project progress and subsequent review.
- (3) Project evaluation will consider stage-specific progress, clarification of scientific questions, development of methods or research tools, potential for further development, and scientific value

generated throughout the research. If the research direction is adjusted in response to new findings, technical limitations, or a redefinition of the scientific question, the principal investigator should explain the rationale for the adjustment, its scientific basis, the revised research strategy, and its scientific significance.

(4) Failure to submit required reports or participate in necessary evaluation procedures may result in adjustment of the approved funding or termination of the project in accordance with relevant NSTC regulations.

Other Provisions

(1) Project contracts, funding, extensions, amendments, financial reporting, and report submissions shall comply with applicable NSTC regulations.

(2) Matters not specified in this announcement shall be handled in accordance with relevant NSTC regulations.

Contact Information

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For questions regarding the online application system, please contact the NSTC Information System Service Desk:

Tel: +886-2-2737-7590, 7591, 7592; 0800-212058