# Analysis of the results of the CAMK PAN scientific evaluation in the framework of the comprehensive evaluation of Polish scientific institutions for the period 2017-2021

To analyze the results of the evaluation of CAMK PAN conducted in 2022, in particular the problem of maintaining the A+ category in the future, the Scientific Council of CAMK PAN appointed a team consisting of:

- Miroslaw Giersz
- Ryszard Szczerba
- Piotr Zycki

Piotr Gawron was co-opted to the team.

A comprehensive summary of the results of the evaluation can be found in Appendix 1 (data obtained from MEiN through access to public information).

Data for Criterion III, descriptions of social and economic impact can be seen at: https://radon.nauka.gov.pl/dane/opisy-wplywu-dzialalnosci-naukowej-na-funkcjonowanie-spoleczenstwa-i-gospodarki

**Summary of CAMK PAN scoring results:**

**Criterion I: 378.66 (max. 439.26 - OAUW)**
**Criterion II: 139.55**
**Criterion III: 30 (max. obtained: 62.5 - UWr; max. possible: 100 points)**

Comparison with the reference unit for Category A:

| Scientific category A | Criterion I | Criterion II | Criterion III | Final result |
|---|---|---|---|---|
| **Reference value** | 339,2 | 27,6 | 46 | |
| **Result of comparison** | 23,4 | 20 | -20 | 23,4 |

The entrance criterion for evaluation for the highest category A+: number of points in criterion I should be above 86% of the maximum number of points. CAMK PAN score: 86.2%

Expert reviews on category A+ can be found in Appendix 2.

## Final result of CAMK PAN evaluation: category A+

(Formal Decision of the Minister of Education and Science - Appendix 3)

OAUW – Astronomical Observatory of Warsaw University

UWr – Univercity of Wroclaw

# General rules of evaluation

An important parameter: the number of employees whose achievements are included in the evaluation, Full-time equivalent, averaged after the evaluation period (*N*-number). For CAMK: **N=60.18**

**Three evaluation criteria:**

1. Scientific quality of research (publications, patents, etc.)
2. Financial effects (grants)
3. Impact on the socio-economic environment

**Publications (60% evaluation contribution):**
Each employee has 4 shares ("slots"); a publication fills all or part of the slot (if co-authored, with co-authors from the same institution).

Publication score:
2017-2018: According to previous journal scoring rules, minimum 1N publications/slots
2019-2021: according to the new scoring, such as:
*Nature, Science, ApJLett, ApJSupp, PhysRevLett*: **200 pts.**
*ApJ, MNRAS, A&A, AcA*: **140 pts.**
(Full list e.g. punktoza.pl website and Appendix 4)

For the evaluation of an entity-discipline (e.g., CAMK-astronomy), 3N shares (not publications) are available. Points for publications/shares are added up, divided by N

**Grants (20% contribution):**
1 point for each PLN 50,000 of total funds awarded during the evaluation period. Increase by:
400% for ERC grants
200% for other European grants
50% for other international measures

**Environmental impact (20% contribution):**
Refers to the scientific achievement (e.g., publications) and the documented impact of this achievement on the broad social, economic, etc. environment, i.e., in general, about the impact beyond the scientific sphere.

**Other rules: penalties,**

- lack of publications by a researcher - reduction of the number shares by 3 for each such employee. In our case, there was one such employee, so the number of our shares was 3N-3 (divided by N).

- Failure to report a researcher for evaluation

**Consequences of evaluation:**
Possible categories: A+ (best), A, B+, B, C (worst)
Rights to award PhD, *habilitacja* degrees: category B+ or better
Financial consequences: annual subsidy from the Ministry depends on the scientific category

# CAMK PAN results in detail

**Criterion I**

| | | |
|---|---|---|
| Selected for evaluation: | 216 publications | |
| Number of points for publications: | 22 758 | |
| Number of points for industrial protection rights: | 30 | |
| Total: | 22,788 | |
| Final (Total/N) | **378.66** | (N=60.18) |

**Criterion II**

| | | |
|---|---|---|
| Number of points for scientific projects: | 8,325.68 | |
| Number of points for revenue: | 72.68 | |
| Total: | 8,398.36 | |
| Final (Total/N): | **139.55 (**next highest: 55 points) | |

**Criterion III**

Impact 1. "Contribution of CAMK PAN to Space Situational Awareness and Space Surveillance and Tracking activities" : 60 pts

Impact 2. " The impact of CAMK PAN on the development of the space industry in Poland through the implementation of scientific space missions.": 0 points

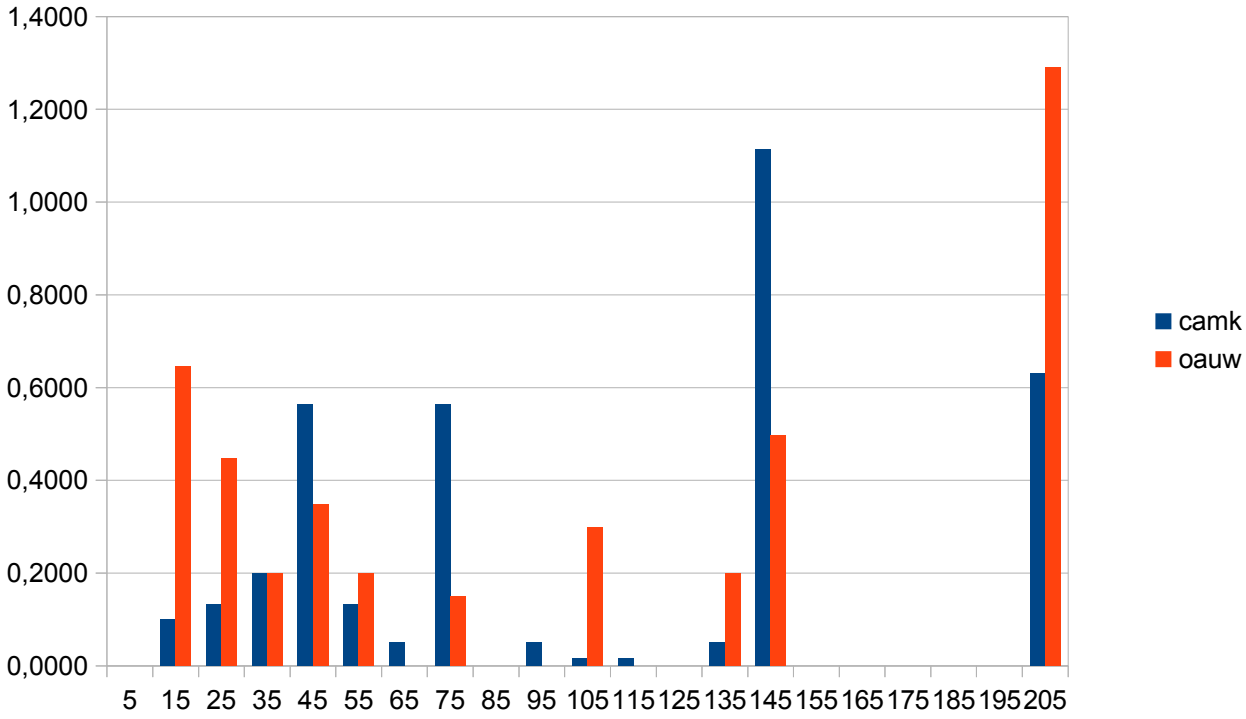
From the justification:
"According to experts, the evidence of impact presented confirms the Subject's commitment to scientific research, while it does not indicate the impact of this research on the socio-economic environment."

Final score: **30 pts**

# Notes and comments

**Criterion I**

CAMK score (378.66) second highest, behind OAUW (439.26)




Distribution of journal values of evaluated publications for CAMK (N=60.18; 216 publications) and OAUW (N=20.15; 86 publications).

Number of publications for 200 pts: CAMK: 38/218 (17%); OAUW: 26/86 (30%).

**In the perspective of the next evaluation, there is a need to increase the number of best valued publications (200 points; published in e.g., *Nature, Science, ApJLett, ApJSupp, PhysRevLett* - the full list of journals assigned to the discipline of astronomy in Appendix 4), as well as monographs, or chapters in monographs. Also worth noting is that e.g. descriptions of newly invented devices or new numerical codes can be published in journals that are not necessarily traditionally considered astronomical, but are nevertheless assigned to astronomy, and are worth 200 points.**
**To avoid an evaluation penalty, each staff member should publish at least one article in the discipline of astronomy during the evaluation period.**

**Criterion II**

Number of points for scientific projects: 8325.7

Grants with the highest value:

ERC Synergy (G. Pietrzynski): 6324.9
MAB/Astrocent (L. Roszkowski): 760.0
DarkWave (EU Twinning; M. Kuzniak): 392.9

other grants (mainly NCN): 847.9
revenue from research services: 72.7
Total (NCN and research services)/N: **15.3** --> below threshold for cat B+ !

**NCN grants are not sufficient in our case to pass the B+ category threshold, despite CAMK PAN being awarded a fairly large number of such grants.**

**It is necessary to seek European grants (ERC, EU, ESA, EUSPA). Also, R&D projects from NCBiR, FENG (European Funds for a Modern Economy) and direct research orders from industry.**

## Criterion III

The experts' assessment (particularly of CAMK PAN's impact on the development of the space industry) was more critical than our own assessment of our impact - an important lesson of caution.

### Outreach and promotion

Examples from other institutions show that *outreach* activities can be considered an important contribution to the socio-economic environment. It is important to go beyond the standard framework of one-way outreach (lectures) and initiate or (co-)organize activities with an interactive component (e.g., competitions). In the case of lectures, modern forms of communication (internet, multimedia) are important. Documentation of such activities is also key.

Modern outreach and promotion activities are required in many projects and can be financed from various sources, including funds from individual projects, dedicated ministerial programs, etc.

It seems necessary to organize a dedicated unit within the institute structure dealing with modern forms of science outreach and promotion of CAMK.

### Commercialization

A particularly high form of the institute's influence on the economic environment would be the commercialization of research results. This is a complex issue that goes beyond the framework of preparations to the evaluation process.

# Concluding remarks

The experience from past evaluations of scientific institutions in Poland is that the evaluation criteria change every time, unfortunately usually during the period under evaluation. When building a strategy for maintaining the highest scientific excellence, one cannot rely solely on the current rules and regulations. The strategy should be based on general trends in Polish and international science combined with CAMK's scientific mission.

**Attachments:**

Appendix 1 - Evaluation results from the Ministry of Education of Science
Appendix 2 - Expert reviews for the A+ category
Appendix 3 - Decision of the Ministry of Education of Science on granting the A+ category
Appendix 4 - List of journals with scores of 100 pts and above to which astronomy is assigned

# Additional notes

In the context of considering the relevance of promotional activities and commercialization, we suggest starting a discussion on the following issues.

## Commercialization

In order to increase the commercialization of research results and know-how, we propose.

1. Identify and describe exemplary commercialization paths.
2. Establish a support system for the commercialization process including legal and administrative support.
3. Conduct an inventory of knowledge, skills and research results at CAMK in terms of commercialization opportunities.
4. Real training of academic and administrative staff in commercialization processes.
5. Creation and continuous updating of the offer for businesses.
6. Actively search for industrial and institutional partners interested in exploiting the intellectual potential of CAMK PAN.

We draw attention to the experience that CAMK PAN has in the space industry. This experience should be used to establish cooperation with space agencies viz: ESA, POLSA, DLR, EUSPA and use their funds.

Commercialization will undoubtedly facilitate the training a new scientific staff in the field of technical sciences, e.g. by establishing a joint doctoral school combining astronomy, space research, and technical computer science and telecommunications.

## Organizational changes

1. Establishment of cells responsible for
    a. coordination and management of projects and commercialization of research results and know-how,
    b. popularization of science, organization of events,
    c. promotion, marketing.
2. Reducing the administrative burden of researchers in order to increase their efficiency by
    a. Implementation of an electronic workflow system.
    b. Develop and implement procedures for implementing standard business processes.
    c. Implementation of IT systems for internal and external communication. Document exchange, chat and video chat platform.

## PR activities

Develop an image strategy for CAMK including:

1. Identification of groups of recipients of information, e.g.: schoolchildren, teachers, students, entrepreneurs, scientific units outside the field, foreign scientific units in the field, government ministries and agencies, citizen scientists, and organizations promoting science.
2. Disseminate information on ongoing and completed projects.
3. Provide clear description of CAMK - its history, mission, research goals.

4. Identification of potential cooperation partners and possible PR activities. For example:
    a) Putting lectures on video platforms.
    b) Training of employees in public outreach and communication skills.
    c) "Research highlights" - the most important publications with popular science abstracts.
    d) Actively create various communities of citizen scientists around CAMK.
    e) Collaboration with influencial science content creators (youtubers).
    f) "Ask the Astronomer" – type activities.
    g) Promotion of space exploration in cooperation with CBK PAN and Polish Space Agency.
    h) Contacts with large organizations like the Central Transportation Port to conduct educational activities, e.g., by posting astronomical content at stations and on trains.
    i) Examples of successful popularization methods with high impact (subjective opinion of P. Gawron):
        i. Dr. Becky
        https://www.youtube.com/@DrBecky
        ii. Sixty Symbols, Ph. Brady Haran:
        https://www.youtube.com/@sixtysymbols
        iii. SciFun
        https://www.youtube.com/user/SciTeraz
        iv. Piotr Gawron:
        https://depot.ceon.pl/handle/123456789/16807
        https://quantumz.io/rewolucja-stanu/
5. Develop communication means and content targeting industry and in particular the space, electronics, IT and energy sectors.

## Sources of funding for popularization of science

- MEiN - Minister's own programs. https://programy.nauka.gov.pl/
    - MOOC - massive online open courses https://navoica.pl/
    - Science for society
- Young Science Foundation: http://fmn.org.pl/
- Popularization work packages in EU projects
- Popularization tasks in NCN grants