Application Manual – Mentorship Program Call

Collaborative Program in Additive Manufacturing

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PART 1: Introduction

1.1. Purpose

This manual provides information on opportunities for funding supported by the Collaborative Program in Additive Manufacturing (CPAM).

The manual is intended to be an easy reference guide to the CPAM Phase 4 funding programs available and to assist potential participants to prepare proposals for funding support. It does not, however, constitute a complete set of policy, procedures or systems supporting the programme.

1.2. Background

Additive Manufacturing (AM) is defined as the process of joining materials to make parts from 3D model data, through a layer upon layer process. AM is, in comparison with machining based subtractive manufacturing processes such as cutting and milling, much more efficient in the utilisation of raw materials in the manufacturing process. More important though, is that AM is considered a digital manufacturing technology, one of the key advanced manufacturing technologies that enable the 4th Industrial Revolution.

AM enables new product development in high-end markets as well as consumer driven markets. Due to the inherent characteristics of AM, it provides designers and manufacturers unparalleled freedom with respect to product conceptualisation and design. It allows the use of a wide range of materials, also materials that have traditionally been difficult to use as feedstock material for products. The freedom of design and wider use of materials for complex product design allow an innovative approach to the design and manufacture of new products.

AM has, however, also demonstrated that it is a useful manufacturing tool for repair and reinstatement of high value parts to their original design specifications. It has also been demonstrated that it may even improve the performance characteristics of existing parts through the use of tailored alloys designed for specific operational conditions.

Although AM has created significant hype and interest from industry, considerable effort is still required to get AM accepted as a standard and reliable advanced manufacturing technology for high-end applications.

The South African Additive Manufacturing Strategy was commissioned by the Department of Science and Innovation (DSI) and published in 2016. Since 2014/15 an implementation program for the strategy has been funded by the DSI. This program, the Collaborative Program in Additive Manufacturing (CPAM), over the past 10 years grew to a successful program supporting new knowledge generation in the field of AM. The program has supported a large cohort of postgraduate students who have done postgraduate research

projects based on research questions identified for both the metal AM and polymer AM technology value chains.

In support of continuing the implementation of the South African Additive Manufacturing strategy[1], CPAM is now launching, as part of Phase 4 of the implementation of the SA Additive Manufacturing Strategy, a number of initiatives aimed at derisking technology and supporting the adoption of the technology as an advanced manufacturing technology by industry.

1.3. Strategic intent

At a high level the CPAM strategic objectives since inception were to:

- Advance the knowledge base in South Africa in selected focus areas of the SA AM strategy.
- Increase the technology readiness level (TRL) of AM to ease adoption by industry.
- Development of human capital
    - Focus is at post graduate level with research topics aligned with the elements in the AM value chain.
- New knowledge generation as measured through:
    - Publication outputs and conference papers presented;
    - Patent outputs;
    - Technology demonstrators and process documents.
- Commercial outputs to support development of an AM industry in South Africa
    - New processes, products;
    - Support for small, medium and micro enterprises (SMMEs).

1.4. CPAM programs

In support of Phase 4 of CPAM the following programs will be supported:

- Industry led R&D projects,
- Postgraduate study support R&D projects,
- Mentorship program,
- SMME support program.

In Part 2 of this manual more details are provided on the call guidelines, eligibility criteria, call timelines and evaluation criteria for these programs. This call document specifically addresses the details and requirements for the **CPAM Mentorship Program.**

[1] https://site.rapdasa.org/wp-content/uploads/2017/02/South-African-Additive-Manufacturing-Strategy.pdf

PART 2: Call, Eligibility, Funding and Timelines

2. Mentorship Program Projects

In this call proposals are solicited for the CPAM Mentorship Program. This call is directed to experienced senior researchers who have retired but can still play an active role in support of research institutions in research and development programs in the field of additive manufacturing (AM), as well as supervising post graduate students in CPAM supported projects. The senior mentors will also have a responsibility to support the researchers at their associated research institutions in formulating research strategies to ensure that the human capital development programs are relevant and aligned with the latest research trends and industry interests.

The call is not specific with respect to whether the focus is on Metal AM or on Polymer AM technology. The main criteria with respect to content will be that the mentorship role supports existing research and development groups active in AM to develop and supervise post graduate students, and to provide leadership with respect to R&D strategies in the field of AM for the group for whom they are mentoring.

2.1 Call for Applications

The Call for the CPAM Mentorship funding program is facilitated by the National Programs group at the CSIR Photonics Centre. A template for new applications is distributed by this office to interested parties via the CSIR Website, the CSIR Photonics Centre's database of contacts, the RAPDASA website and RAPDASA database of contacts, as well as through social media channels available to the CSIR, the DSI and RAPDASA.

Proposals in response to this call must be forwarded to the CSIR Photonics Centre's National Programs project office, at the e-mail address hgreyling@csir.co.za and nlcrentalpool@csir.co.za.

The scientific and technical contents of the proposed project will be refereed through a peer review mechanism to assess the quality of the research proposal submitted. Evaluation of the proposals will be done based on a predefined evaluation framework. Applications must be substantial and comprehensive to allow proper assessment of the research proposed.

Applicants are encouraged to approach the CSIR Photonics Centre for assistance with completion of the application.

2.2 Eligibility criteria

Proposals may be submitted by any experienced research professional who is not full time employed and who has worked extensively in the field of AM.

The following should be noted with respect to the eligibility criteria:

- The applicant should have at least a doctoral degree in the field related to additive manufacturing.
- The applicant must have an active supervision of postgraduate students track record, i.e. the applicant must have supervised students at doctoral and master's level during the past 5 years.
- The applicant must have a strong research track record, with a good publication track record. There must be proof of publications which were authored or co-authored in the past 3 years with topics related to additive manufacturing.
- The proposed mentorship role must be focussed on support towards research and development projects in additive manufacturing processes and/or AM hardware.

Applications from applicants who are employed as a full-time researcher at a South African research institution active in the field of additive manufacturing will not be considered for funding.

2.3 Funding

An annual budget request per project of **R 275 000 maximum** is allowed. The budget request should be justified based on the scope of work proposed, as well as the capacity of the institution where the applicant will be contracted to supervise postgraduate students.

It is important for the institution to also demonstrate support for the project proposal through co-funding of the mentorship.

The following costs are allowable costs:

- Mentorship grant: Labour costs associated with fulfilling a mentorship role at the research institution. It is expected that the mentorship fee does not attract any institutional overheads.
- Other costs can be travel or consumable related costs which are specific to the mentorship project. Applicants are requested to provide a breakdown of these costs in the budget table.

The following costs are not supported:

- Costs associated for the acquisition of capital equipment.
- Cost associated with the purchase of computers.

2.4 Duration of the Project

The duration of a mentorship project supported by CPAM will depend on the scope of work to be undertaken. Project durations can be between 12 months and 36 months as a maximum. Depending on the number of projects supported and the availability of funding it is anticipated the CSIR will consider the possibility of additional calls to be issued on an annual basis.

For multiple year projects contracting with successful applicants will be on a yearly basis from 1 April to 31 March of the next year. Continuation funding for a second or a third year for approved projects can only be considered based on the submission of a comprehensive annual progress report at the end of each year of the project. Continuation is subject to the progress reported in the Annual Progress Report and the quality of the Annual Progress Report.

Continuation beyond the first three years can be considered if a new funding application is submitted to support a continued research program, subject to funding available from the DSI.

2.5 Timeline

The timelines for submitting a proposal to the CPAM Mentorship project call is shown in Table 1. Also listed in this table are the expected dates for the outcomes announcement of the applications.

Table 1: Call & outcomes announcement

Description	Start date	Closing date
Opening of Call for proposals	T0	T0 plus 4 weeks
Announcement of outcome	T0 plus 8 weeks	T0 plus 10 weeks
Contracting with successful applicants	T0 plus 12 weeks	T0 plus 16 weeks
Call for 1st Annual Progress Report	28 February 2025	24 March 2024

2.6 Assessment process

All applications received by the CSIR will be screened by the CSIR CPAM management based on whether eligibility criteria in terms of the theme, funding and other resource requirements were met. Proposals that meet the eligibility criteria as stipulated in the call document, will be submitted to an independent CPAM review panel appointed by the CSIR, in consultation with the DSI.

The CPAM review panel members will be appointed subject to the signing of a non-disclosure agreement, as well as a conflict-of-interest declaration. Proposals will be shared with all reviewers for transparency, however, a reviewer may choose not to review a particular proposal. The evaluation criteria will be clearly stated in the evaluation documents sent to reviewers.

The role of the CPAM review panel is to assist the CSIR in the review of the proposals received. Upon conclusion of the review process the CPAM review panel will make a recommendation to the CSIR Photonics Centre on which proposals should be funded. The panel will consist of experts from industry, universities and international experts. The assessment will primarily focus on the following aspects:

- Quality of proposal / plan / reporting – 10%
- Applicant's research track record – 15%
- Applicant's HCD supervision track record - 15%
- Motivation including the value proposition for the mentorship position – 20%
- Scope to support human capital development - 20%
- Outputs committed to by the project - 20%

Applicants are encouraged to ensure all the necessary information is captured in the proposal that would be required for the review panel to do a fair assessment of the proposed work.

Continuation applications will also be assessed on progress against the project plan, hence progress reports submitted to the CSIR Photonics Centre will form part of the application and evaluation process.

It can be expected from applicants to present new applications to the CPAM review panel during the assessment process. This presentation usually happens through a virtual platform such as MSTeams, however, the CSIR can also request that this be done in person at a meeting to be scheduled by the CSIR.

2.7 Proposal assessment criteria

Assessment criteria will be used to maintain consistency during assessment of research proposals with each criterion assigned a weight (see **Table 2 and Table 3**).

Table 2: Assessment criteria for new applications

Criterion	Details	Weight
Quality of the proposal 10%	Quality and the detail of the application	10%
Research track record 15%	An active research record with publications in the past 3 years	15%
HCD supervision track record 15%	An active HCD supervision record with D and M student supervision and graduation in the past 5 years	15%
Motivation and value proposition 20%	The strength of the motivation and the value proposition of the mentorship candidate	20%
HCD support and output 20%	Doctoral students supported	10%
	Master students supported	5%
	Other members of research team supported	5%
Knowledge outputs committed 20%	Journal and publication output planned	10%
	Knowledge Outputs planned	10%

Table 3: Assessment criteria for annual progress reports

Criterion	Details	Weight
Progress with project execution 10%	Progress reported and quality of report	10%
Research track record 15%	An active research record with publications in the past 3 years	15%
HCD supervision track record 15%	An active HCD supervision record with D and M student supervision and graduation in the past 5 years	15%
Motivation and value proposition 20%	The strength of the motivation and the value proposition of the mentorship candidate	20%
	Doctoral students supported	10%

HCD support and output 20%	Master students supported	5%
	Other members of research team supported	5%
Knowledge Outputs committed 20%	Journal and publication output achieved	10%
	Knowledge Outputs achieved	10%

Based on the recommendations from the CPAM review panel, the CSIR Photonics Centre will do budget allocations, rank the proposals received and decide on the projects which will be funded in the next funding cycle.

2.8 General comments

It is important that proposals submitted are concise and only provide information relevant to what is requested in the proposal template. However, information provided must be comprehensive, to allow the reviewers an opportunity to accurately assess the potential of the proposal. The review team will only assess proposals based on what is written in the proposal / annual progress document, as supported by the presentation made by the applicant or the grant holder.

Applicants and grant holders should also respect the review process, and the CSIR appointed CPAM review panel. Applicants and grant holders are encouraged to not copy and paste sections from one part of the proposal or annual progress report to another.

PART 3: MANAGEMENT OF CPAM GRANTS

3.1 Contracting

For approved projects a CSIR CPAM contract will be established that contains the clauses and requirements for the management of the project funding. The contract addresses responsibilities, intellectual property issues, deliverables, as well as the financial arrangements associated with the project. The contract is between the CSIR Photonics Centre and the host institution of the applicant.

The contract will be an annual contract and will be renewed annually through a new contract or a contract amendment for the funding allocation in subsequent years **subject to the submission of an annual progress report, as well as a favourable review of the progress report.**

3.2 Reporting requirements

On accepting the award (signing the contract), the grant-holder will be required to deliver on the annual research plan that formed part of the accepted application. An annual review meeting is scheduled where all grant holders are required to report on progress. Attendance of this meeting is compulsory.

At the end of the financial year, or at the end of the project, the grant-holder will be required to prepare and submit an Annual Progress Report or a Final Progress Report on the project to the CSIR Photonics Centre. The annual report must address project progress, delivery on milestones, project outputs and outcomes as presented in the research plan. In instances where the original project application was a multi-year proposal, the annual progress report will be used in an evaluation process to determine whether the project will continue in the next financial year.

3.3 Payment of Grants

Claims for payments of costs associated with the project including labour costs, student support costs and running expenditure as approved as part of the project should be submitted to the CSIR Photonics Centre for payment. Claims should be submitted as an invoice. The CSIR reserves the right to also request associated proof of expenses in support of invoices submitted to the CSIR.

Invoices for payments should be addressed to:
The CSIR Photonics Centre
PO Box 395
Pretoria
0001.
e-mail: hgreyling@csir.co.za

All invoices should reflect the CSIR's VAT no. 4470114283

All invoices should also reflect the unique reference number assigned to the project, and available on the CPAM contract, or from the CSIR Photonics Centre.

3.4 Assistance

Should you require clarification on any of the processes, criteria or plans presented in this manual please do not hesitate to contact Hardus Greyling at 012 841 2713 or 082 445 4057, email hgreyling@csir.co.za