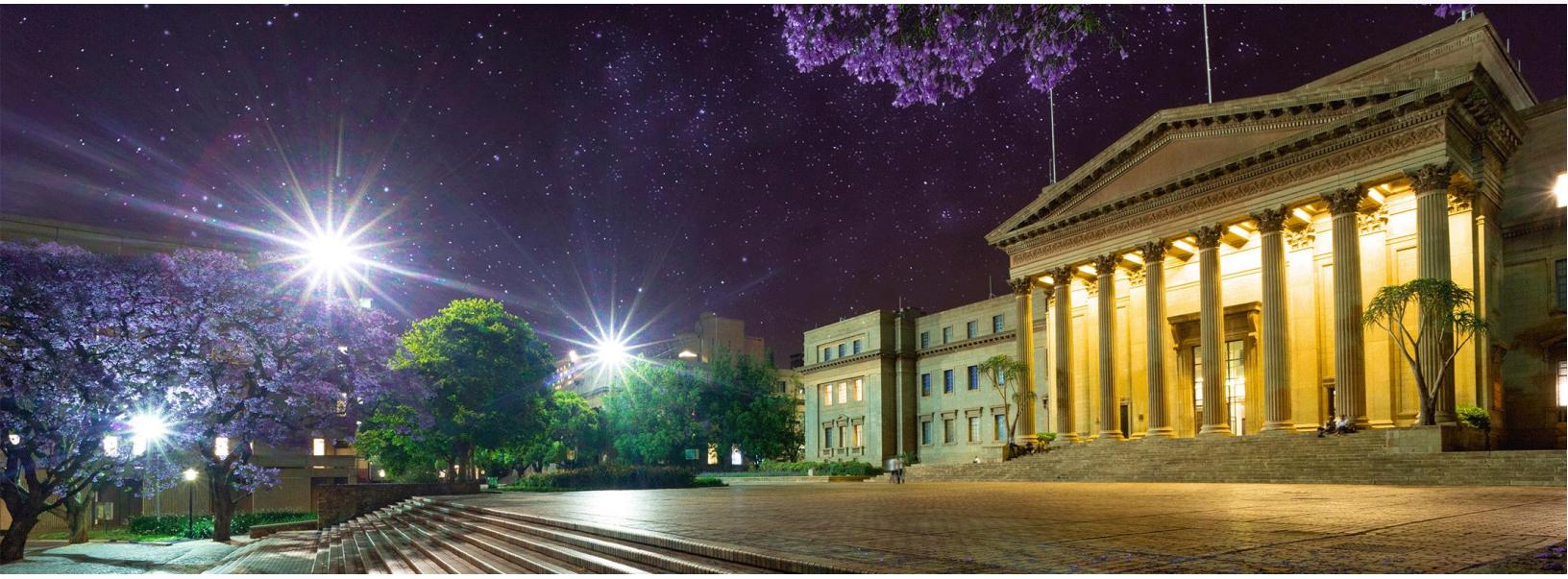
The AI Africa Consortium

Opening Africa to AI Research, Application and Commercialisation.



AI AFRICA CONSORTIUM

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

100 1922 2022

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1 Introduction

Advances in Artificial Intelligence (AI) and its application in Africa has the potential to drive innovation in industry and shape the societal landscape of tomorrow. While Africa was largely absent from the Internet Revolution there is now a growing realisation of the importance of technology in building societal prosperity.

With growth in learning and communication, and with several strong and internationally competitive universities there is substantial interest in AI from faculty and students in the region.

Yet the region has not expanded fast enough to fully realise the opportunities presented and there is now a rapidly growing need for talent, infrastructure, and funding to support innovation. To move beyond the hype and be competitive with the substantial accumulation of resources in North America and more recently in Asia, requires efforts on a magnitude far greater than any previous spanning academia and industry.

This has led to the formation of Cirrus, to bring about a step change in the research and application of AI in the region.

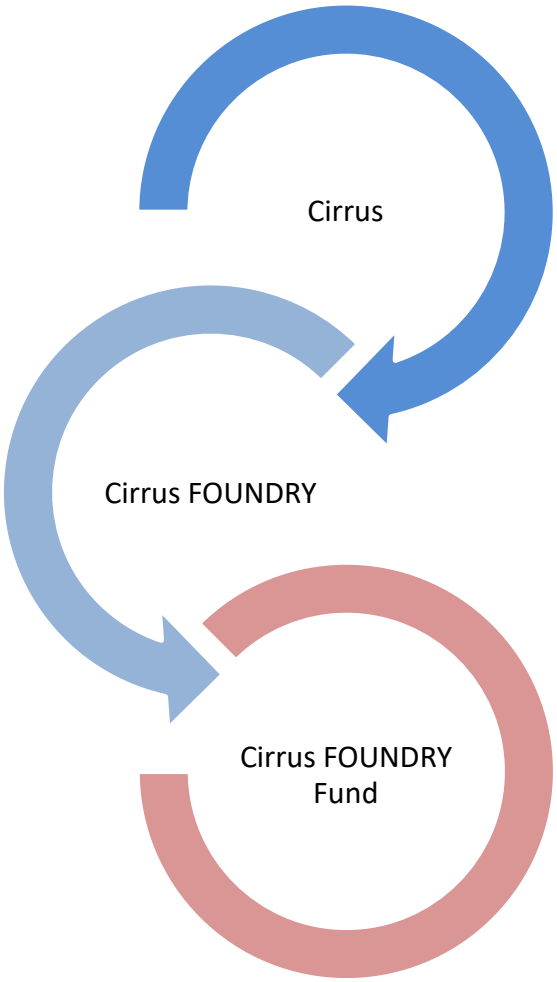
AI Africa Consortium website: 

1.1 About Cirrus

Cirrus is a private sector led initiative bringing together academia and industry to establish a world class AI research and application capability for Africa and beyond.

1.2 Cirrus Components and Programs

- HW / SW / Data / ML Engineering
- Global Collaboration Network
- Partner and Affiliate program
- Co-development
- Open Learning
- Summer and Winter programs
- Salons and teatime sessions
- Academic programs
- Research to Communication program
- Digital Asset Locker
- Sandbox
- HPC platform
- Data management platform
- Research support



- Ideation
- Product creation
- Start-up portfolio
- Monthly classes, events and workshops
- Academic programs

- Pre-seed
- Seed

1.3 About the AI Africa Consortium

The establishment of the AI Africa Consortium, led by the University of the Witwatersrand, provides the mechanism for bringing together Consortium Members with a vested interested in the success and sustainability of Cirrus. The Consortium is a consortium of universities, research organisations and government agencies that receive a variety of benefits and the opportunity to provide feedback to shape the future direction of Cirrus. The Consortium works synergistically with Members in advancing the adoption of Cirrus by academic and research entities, to evangelise Cirrus among potential users and promote new advances emanating from Cirrus.

1.4 Membership Classes

Tier 1 Members

Tier 1 Members are entities that appoint Ambassadors and are therefore able to influence Consortium activities and governance through the Ambassador Advisory Network. Tier 1 Members have a higher priority for accessing Cirrus resources and for collaborating on new funding opportunities.

Tier 2 Members

Tier 2 Members are entities that do not appoint Ambassadors, but still have access to many Cirrus resources.

1.5 Ambassadors

Ambassadors serve as community builders, making connections between people and resources. Ambassadors will be senior strategic individuals within their local institution and will be supported by a project manager where necessary.

Typical Ambassador activities will include:

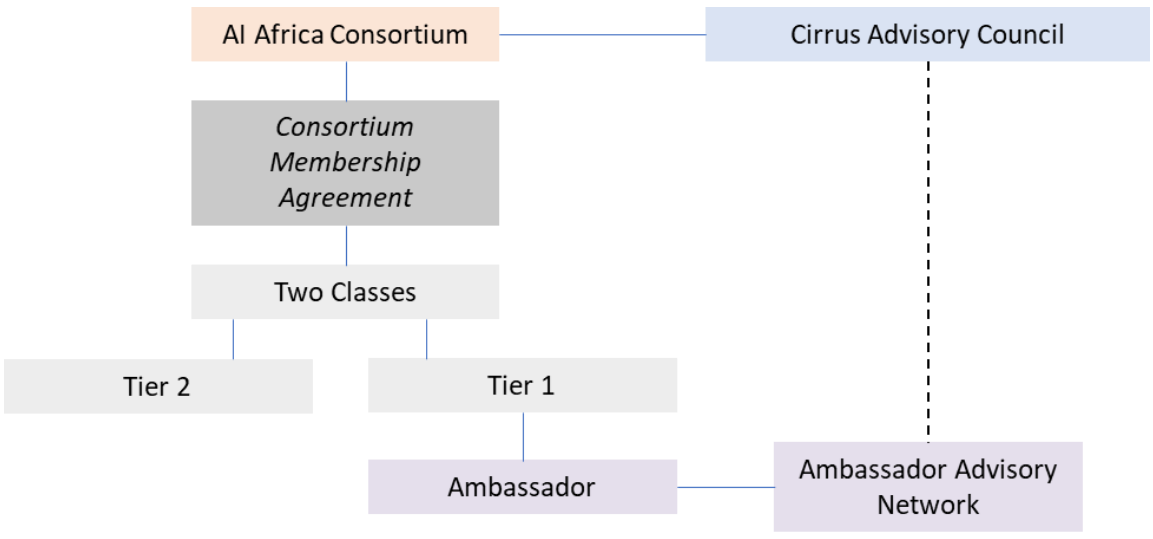
- Hosting awareness sessions for their local institution's researchers, educators, students, scholars, and administrators about Cirrus.
- Meeting with individuals and educating faculty on their campuses who are eager to learn more about Cirrus.
- Establishing and managing partnerships with faculty on-campus.

- Learning from peers by participating in periodic face-to-face meetings and at conferences.
- Sharing information with other Ambassadors.
- Leading the integration of instruments, sensors, shared computational resources, and data repositories at their local institution.
- Plan and submit funding requests.
- Connect Cirrus with useful resources and helpful people on their campus.
- Point interested individuals toward services and resources available at Cirrus.
- Working with the Cirrus Assistantship program on the analysis of supply and demand, to identify what is required to meet future needs.
- Lead the development of key communities of practice, including connections with international communities and initiatives.

The appointment of Ambassadors to establish on campus expertise will ensure:

- Greater visibility for the institution's research activities.
- Synergy between projects.
- Provision of expertise that is otherwise difficult for individual projects to obtain.
- Lower learning curves.
- Improved retention of top-quality researchers by providing opportunities to collaborate on ground -breaking projects.

1.6 Schematic of the AI Africa Consortium



1.7 Membership Benefits Table

	Tier 1	Tier 2
Cirrus		
Global Collaboration Network	Integration with Ambassador Advisory Network	
Partner and Affiliate program	Integration with Ambassador Advisory Network	✓
Co-development program	Integration with Ambassador Advisory Network	✓
Open Learning	✓	✓
Summer and Winter programs	✓	✓
Salons and teatime sessions	✓	✓
Academic programs	Priority Access	✓
Research to Communication program	Priority Access	✓
Digital Asset Locker	Priority Access	✓
Sandbox	Priority Access	✓
HPC platform	Priority Access	✓
Research support	Priority Access	✓
Infrastructure programs (FABRIC hank node, Open Storage Network etc)	Priority Access	✓
Right to host events at Consortium forums	✓	
Inclusion on Consortium led contracts	Priority inclusion through Ambassador Advisory Network	✓
Ambassador Advisory Network	✓	
Distribution of Members' marketing material	✓	
Cirrus FOUNDRY		
Monthly classes events and workshops	✓	✓
Academic programs	Priority Access	✓
Cirrus FOUNDRY Fund		
Pre-seed	✓	✓
Seed	✓	✓

2 Explanation of Benefits: Cirrus

2.1 Global Collaboration Network

The Global Collaboration Network will be responsible for proactively developing and managing substantive collaborative relationships covering all that Cirrus has to offer, from research and talent to start-up development. As the Cirrus collaboration efforts are focused on solving real world problems, relationships with industry are essential to ensure that faculty and students are engaged in relevant work. These complementary relationships benefit the corporate participants, universities, and broader society through development of talent, knowledge, and application.

2.2 Partner and Affiliate Program

Cirrus will establish and manage external collaborative engagements through cooperation agreements with industry. This will include the establishment and management of an Affiliate program and Partner program.

Affiliate Program

The Affiliate program will enable corporate entities to interact with Cirrus and take advantage of a variety of programs and activities including:

- Website and publication exposure.
- Annual orientation covering all the Cirrus resources, activities, and programs.
- Insight into Cirrus research and projects being undertaken in the academic programs and ability to engage with faculty and students.
- Invitations to lectures and workshops.
- Direct interaction with students and student groups for recruitment and ability to host recruiting events such as tech talks and roundtables.

- Connection to university recruiting focused departments.
- Discounts on in person Summer and Winter programs.
- Engagement with the Cirrus FOUNDRY start-ups providing insight into transformative new technologies and business opportunities.
- Networking events and the opportunity to connect with leaders from other top universities, companies, and start-ups from around the world.
- Ability of the Affiliate to leverage the sponsorship in terms of publicity.

Partner Program

The Partner program supports close engagement with a small number of corporate entities and is focused on active research collaboration and on participation on the Advisory Council. Partnerships under the Partner program are tailored to ensure mutual benefit and include all the benefits of the Affiliate program, with the addition of:

- Insight and access to Cirrus research and technology prior to public release.
- Access to the Pitch, a networking event where the Cirrus FOUNDRY start-ups present to Partners.
- Workshops to explore joint research opportunities.
- Hosting of Partner data for research projects including training systems and deriving insights.
- Targeted support for student researchers and research projects.
- Participation in seed-funded projects.
- Placement for visiting fellow(s).
- Seat on the Advisory Council.
- Company day at Cirrus.

2.3 Co-development

The Co-development program is a collaborative program spanning academia and industry focusing on the co-development of Cirrus related infrastructure. This includes collaboration with hardware and software providers to support integrated solutions that amongst other things, improve performance, reduce energy consumption, and improve energy efficiency.

2.4 Open Learning

Cirrus will establish and manage an Open Learning program which will ensure all material originating from Cirrus and used in the teaching of Cirrus internal courses will be made freely available, including through the web.

2.5 Summer and Winter Programs

These in person one-week and two-week programs are intended for faculty, graduate students, post-doctoral fellows, professionals, and others who would like to gain an understanding for their respective fields, new research directions, and industry applications.

2.6 Salons and Teatime Sessions

Salons and teatime sessions are open gatherings for the exchange of knowledge and ideas intended to facilitate the growth and development of a vibrant AI community.

Salons

Inspired by the enlightenment-era salons, the monthly salon will provide an opportunity to bring all Cirrus participants together in a face-to-face exchange of ideas through conversation, devoid of modern entanglements such as PowerPoint presentations and time constraints.

Teatime Sessions

Teatime sessions will be organised on a weekly basis as talks/presentations/show-and-tell on various topics pertaining to AI. All material from the session will be made available online.

2.7 Academic Programs

Cirrus intends to substantially improve undergraduate, graduate, and post-graduate student opportunities through the following academic programs.

Residency Program

The 12-month program will be similar to spending a year in a Masters or PhD program in machine learning. Residents will read papers, work on research projects, and will be encouraged to publish their work. By the end of the program, residents will have significant research experience in machine learning. Residents will have the opportunity to be mentored by scientists and engineers from various teams within Cirrus and will work on real world machine learning problems and applications. In addition, they will have the opportunity to collaborate and partner closely with various research and applied groups across Cirrus. Typical candidates will have a BSc, MSc or PhD or equivalent experience in STEM field such as Computer Science, Mathematics, Statistics, Physics, Engineering or Materials Science. However, applications will not be restricted to these fields, as the interest is in individuals who are motivated to learn and have a strong interest and passion for machine learning.

PhD Internship Program

In this 5-month program interns will collaborate with scientists and engineers to design, implement and evaluate machine learning algorithms and techniques. Interns will engage in team collaborations to meet research goals, report and present research findings and developments. Interns will bridge the gap between research and products by integrating new fundamental research into applied projects and identifying interesting real world problems to research. This program will be targeted at interns that are studying towards a PhD in machine learning or a related field and are in their penultimate or final year of study.

Postdoc Program

The 12-month program is for graduating PhD students, ideally suited for those wanting to become leaders in the field. The program provides the opportunity to participate in cutting-edge, multidisciplinary research, both theoretical and applied, providing the necessary expertise prior to moving into industry or a faculty position.

The post holder will have considerable freedom to pursue novel research projects within Cirrus areas of interest, either individually or in collaboration with team members. There is also the opportunity to have research outcomes realised in new products and services through the Cirrus FOUNDRY.

The postdoctoral position provides the opportunity to:

- Gain research experience with expert guidance in a multidisciplinary setting.
- Earn authorship credit.
- Participate in the Open Learning program, salons, teatime sessions, in person Summer and Winter programs, seminars, lectures, and conferences.

Postdocs will have a PhD in a relevant discipline and the ability to contribute at the leading edge of research, or in its application.

Assistantship Program

The duration of the Assistantship program will vary depending on the requirement. It is designed to combine specialised technical skills with research experience to enable innovative research. The Assistantship program will therefore provide the capability to support projects where specialised analysis, visualisation, or development skills will enhance a project or are required for its success.

The Assistantship position provides the opportunity to:

- Consult and provide assistance to researchers in addressing a wide range of data challenges.
- Develop and deliver training for students, faculty, and staff (to be included in the Open Learning Program).
- Collaborate with researchers on projects requiring machine learning, data engineering, data visualisation, programming and computational skills.

Intern Program

The duration of this program is based on continued business need, availability of funding, and satisfactory job performance. Assignments may include:

- Community and events coordinator.
- Communications.
- Graphic design.

2.8 Research to Communication Program

The Research to Communication (RtC) program is a program to assist researchers in ensuring research is clearly and concisely conveyed to a broad audience. Such communication skills are of vital importance and Cirrus will therefore offer programs to researchers that provide assistance and coaching to enhance their presentation skills in communicating the results of their work.

2.9 Digital Asset Locker

Digital assets consist of reusable software components and workflows that have been designed and validated. They are designed for use in similar applications while being flexible enough to be adapted to address new applications in the future. The digital assets will be available to access through various options including:

- As a service.
- Software licensing.
- Collaborative R&D projects.

2.10 Sandbox

Cirrus will establish a sandbox environment. The sandbox environment will be utilised to train and test models too large for a conventional desktop or laptop and not large enough to warrant deployment on the Cirrus HPC platform. The sandbox environment will also be used to prototype scaled down versions of models prior to running on the Cirrus HPC platform.

2.11 Cirrus HPC Platform

Cirrus will establish a state-of-the-art HPC platform. This platform will be utilised for modelling efforts requiring substantial computing resources and is designed to support ground-breaking research in AI. The Cirrus computing platform will be developed in close collaboration with hardware and software providers resulting in a platform that provides cutting edge performance, reduces energy consumption, and improves energy efficiency.

2.12 Research Support

Cirrus engineering teams utilising the Cirrus infrastructure will work together with universities to support cutting edge research. This includes:

- An overhaul of how research data is generated and processed to significantly improve the quality and quantity of data.
- Enabling the rapid processing of data to assist researchers in needed outputs like data visualisation for example.
- The utilisation of Natural Language Processing (NLP) to support research efforts, including the identification of strategic research opportunities.
- Alignment to international data commons and open access data initiatives.
- Enabling researchers to easily apply the latest advances in AI to significantly improve research outcomes including cutting edge simulation work through the provision of full machine learning-in-the loop science, community machine learning benchmarking, and machine learning retraining with new data.

2.13 Infrastructure Programs

Fabric Hank Node

FABRIC is a unique national research infrastructure to enable cutting-edge and exploratory research at-scale in networking, cybersecurity, distributed computing and storage systems, machine learning, and science applications. It is an everywhere programmable nationwide instrument comprised of novel extensible network elements equipped with large amounts of compute and storage, interconnected by high speed, dedicated optical links. It will connect a number of specialised testbeds (5G/IoT PAWR, NSF Clouds) and high-performance computing facilities to create a rich fabric for a wide variety of experimental activities. It is the intention to connect the Cirrus HPC platform to the FABRIC testbed and establish the “hank” node for Africa. Additional information on FABRIC is available at: https://fabric-testbed.net

Open Storage Network

Open Storage Network (OSN) is a distributed data storage service providing petabytes of shared, easily accessible storage to support active data sharing and transfer between academic institutions,

communities and projects, leveraging existing infrastructure. OSN facilitates scientific and scholarly research by improving data access and the re-use of high-value, high-impact datasets capable to accelerating discovery and generating synergies across new and existing science projects.

Cirrus intends to host an OSN pod. These pods are petabyte-sized distributed storage units with minimal administrative overhead, capable of high-throughput, high-speed large volume data transfers. Additional information on OSN is available at: https://www.openstoragenetwork.org/

2.14 Right to Host Events at Consortium Events

Tier 1 Members will be allowed to host events at Consortium events and the Consortium will promote such events to attendees and in event marketing material.

2.15 Inclusion on Consortium led Contracts

Tier 1 Members will be prioritised for inclusion on Consortium led contracts including grant submissions.

2.16 Ambassador Advisory Network

The Ambassador Advisory Network is a forum for Ambassadors to aid the Consortium through the following actions:

- Serve as community builders making connections between people and resources within their local institution.
- Provide recommendations for Consortium operations.
- Provide recommendations on potential Consortium Members.
- Provide recommendations on directives aimed at fulfilling the Consortium Mission.

2.17 Distribution of Member's Marketing Material

Cirrus will maintain and distribute marketing material, use cases, and position papers from Tier 1 Members. The Consortium will work to ensure such material are distributed to other Members and non-members as appropriate and promoted at Consortium hosted events.

3 Cirrus FOUNDRY Components and Programs

3.1 Overview

The Cirrus FOUNDRY will create a collaborative environment connecting start-ups to Cirrus students, researchers, faculty, corporate partners and capital concerned with real world AI innovation. By leveraging resources within Cirrus and the Cirrus FOUNDRY, start-ups will be better able to tackle challenging problems across a range of industries and drive innovation toward a significant impact on society. Importantly, the Cirrus FOUNDRY will specialise in fostering support for early stage innovations and in helping start-ups make the transition from science and engineering to real world application.

The Cirrus FOUNDRY will ensure that start-ups have the necessary resources, people and skills, as well as create a vibrant community of innovative problem-solvers, working across disciplines to advance AI research and drive the application, adoption and commercialisation of AI technologies. The Cirrus FOUNDRY will also provide those that want to lead AI research with the flexibility to work on commercial applications with companies or in their own start-ups. Further, collaboration with business schools will enable programs from these schools to be integrated into the Cirrus FOUNDRY's start-up projects. This will provide business school graduates with necessary hands-on experience in real world start-ups, and the Cirrus FOUNDRY to benefit from the talent flowing from these schools.

At its core the Cirrus FOUNDRY will support building knowledge and skills surrounding entrepreneurship and the development of innovative AI ideas originating from Cirrus for deployment.

3.2 Monthly Classes, Events and Workshops

University students, researchers, and faculty, will visit the Cirrus FOUNDRY each month for classes, events, and workshops. Monthly classes, events and workshops will provide:

- Case studies on AI companies.
- Business coaching.
- Interactive brainstorming.
- Pitch competitions.
- Meeting potential project partners.
- Guidance on proof of concept for product validation and market identification.

3.3 Academic Programs

Cirrus FOUNDRY PhD Internship Program

In this 5-month program interns collaborate with scientists and engineers to design, implement and evaluate machine learning algorithms and techniques. They will also collaborate with entrepreneurs, financiers, and product managers. Interns engage in team collaborations to meet product goals and bridge the gap between research and products by integrating new research into applied projects and products. Interns will be studying towards a PhD in machine learning or a related field and are in their penultimate or final year of study.

Cirrus FOUNDRY Residency Program

In this 12-month program residents actively contribute to start-ups in the Cirrus FOUNDRY. By the end of the program, residents will have significant experience of working in a real-world start-up. Similar in nature to the Cirrus Residency Program, but incorporates a greater diversity of fields including finance, law, project management, marketing, communications, and MBA's. Targeted at individuals who are motivated to learn and have a strong interest and passion for the real-world application of machine learning, particularly in a start-up context.

Partner and Affiliate Program Integration

Corporate participants in the Cirrus ecosystem will work with the Cirrus FOUNDRY start-ups to provide industry-specific knowledge and resources to reduce the latency in bringing innovations to market in addition to providing entrepreneurs with added visibility and mentorship. Corporate participants will also gain insight into transformative new technologies and business opportunities.

4 Cirrus FOUNDRY Fund

4.1 Overview

The Cirrus FOUNDRY fund is a pre-seed and early stage fund. The fund will enable start-ups to bridge the “Valley of Death” – the associated challenge of turning a start-up idea or scientific research into a large-scale commercial application.

The Cirrus FOUNDRY Fund will enable the Cirrus FOUNDRY to:

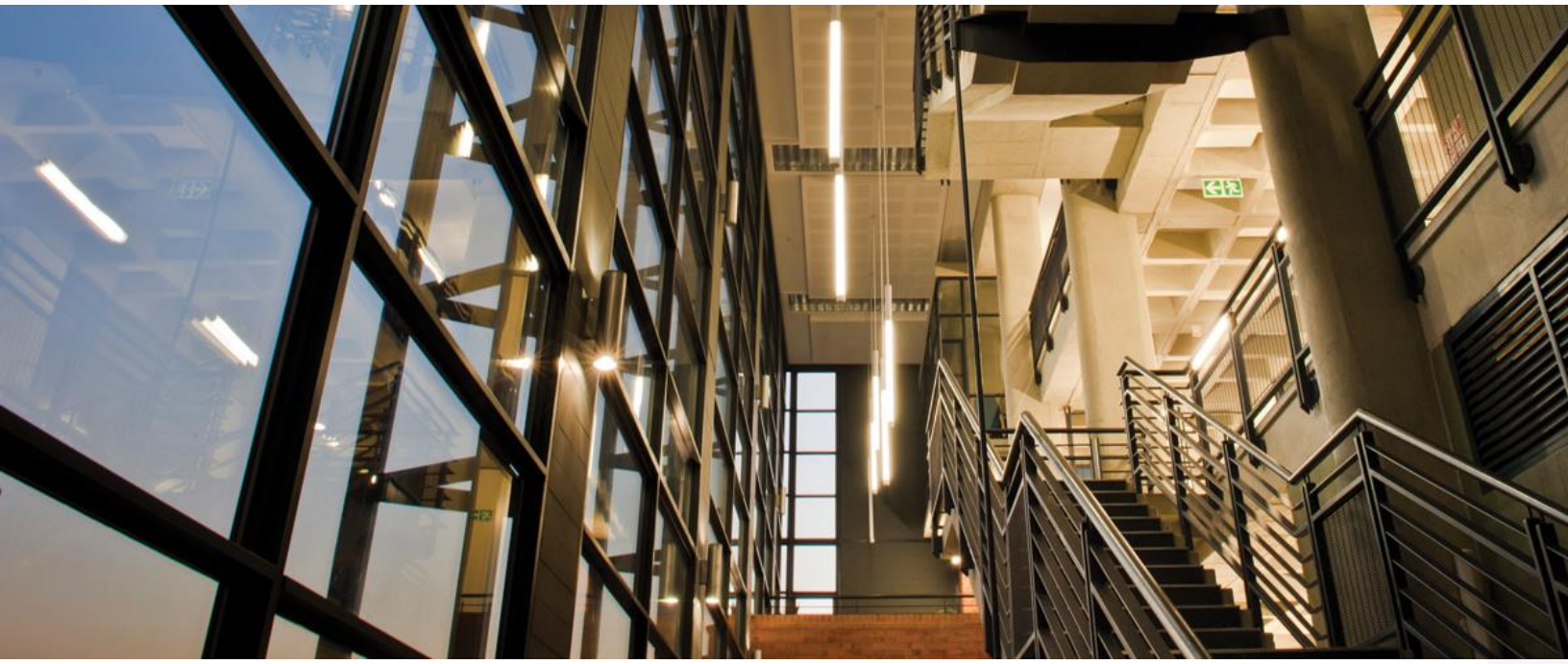
- Maximise the ownership stake.
- Maximise valuation of the start-up.
- Ensure start-ups are not wholly dependent on outside capital.
- Increase the short-term success prospects of the start-up.

4.2 Investment and Eligibility

For the majority of investments capital will be allocated at the pre-seed stage, with investments of up to 250 000 USD. The FOUNDRY Fund will also follow a lead investor in seed rounds, with investments of up to 500 000 USD.

The Cirrus FOUNDRY Fund will invest in startups that have:

- Cirrus student or alum from the Residency, PhD Internship, Postdoc or Assistantship programs.
- Cirrus research scientist.
- Participating university faculty member.
- As well as any start-up using technologies based on Cirrus research.



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