

# Quantum Physics Research Group



Cape Peninsula  
University of Technology



science & innovation  
Department:  
Science and Innovation  
REPUBLIC OF SOUTH AFRICA



INTERNATIONAL YEAR OF  
Quantum Science  
and Technology



South African  
Quantum  
Technology  
Initiative

## The Product Journey: From Spark to Shelf

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# Overview

## The Product Journey: From Spark to Shelf

- From Idea to product
- What do we do
- Technology Transfer Office (TTO)
  - Protecting IP
  - Turning Researcher into Entrepreneur
- Funding opportunities
- Spin-off vs Licensing
- Creating your own business.
  - Business structure
  - CIPC

# Ideation and Validation

- **Define the problem:** See a need, fulfil a need.
- **Identify your audience:** Who needs this solution?
- **Research the market:** Are there competitors? What makes your idea unique?
- **Validate the concept:** Talk to potential users, run surveys, or build a simple prototype.

# Planning and Design

- **Set clear goals:** What does success look like?
- **Sketch the solution:** Wireframes, mockups, or flowcharts.
- **Choose your approach:** Physical product, app, service, etc.
- **Design for usability:** Prioritize user experience and accessibility.

# Development and Prototyping

- **Build a minimum viable product (MVP):** Focus on core functionality.
- **Test early and often:** Get feedback from real users.
- **Iterate quickly:** Refine based on what works and what doesn't.

# Launch and Marketing

- **Craft your story:** Why does this product matter?
- **Choose your channels:** Social media, email, events, partnerships.
- **Build anticipation:** Teasers, beta access, early reviews.
- **Launch strategically:** Time it well and support it with strong messaging.

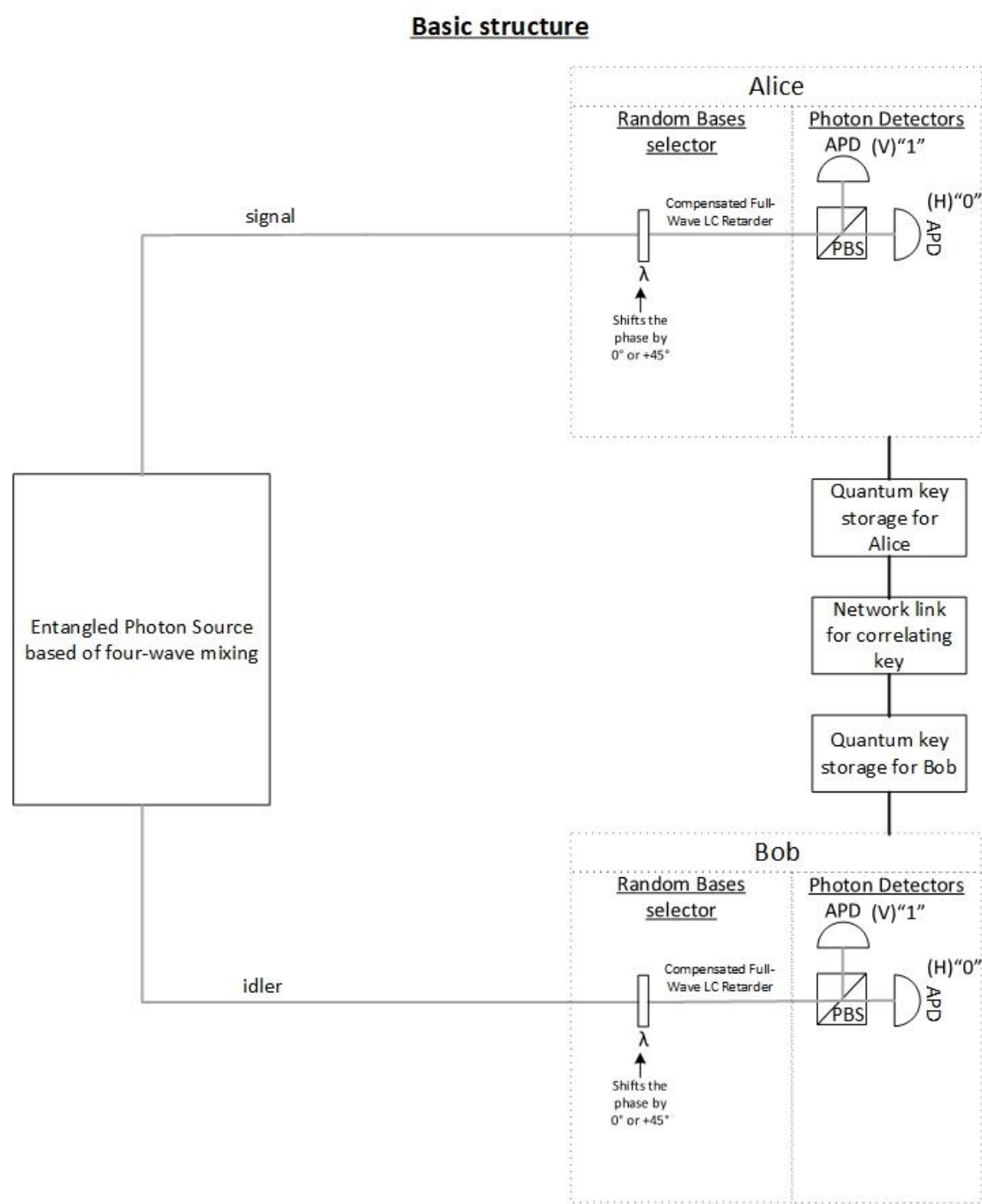
# Growth and Scaling

- **Track performance:** Use analytics to understand usage and impact.
- **Improve continuously:** Add features, fix bugs, enhance User experience.
- **Scale operations:** Expand production, team, or infrastructure.
- **Listen to users:** Their feedback is your compass.

# Technology Readiness Levels

| TRL   | Stage                                        | Description                                                      |
|-------|----------------------------------------------|------------------------------------------------------------------|
| TRL 1 | Basic principles observed                    | Initial scientific research; no practical application yet        |
| TRL 2 | Concept formulated                           | Hypothesis or idea proposed; early theoretical models            |
| TRL 3 | Experimental proof of concept                | Lab-based validation of core principles                          |
| TRL 4 | Technology validated in lab                  | Prototype or subsystem tested in controlled lab conditions       |
| TRL 5 | Technology validated in relevant environment | Tested in simulated or real-world conditions (e.g., pilot plant) |
| TRL 6 | Prototype demonstrated                       | Full prototype tested in relevant environment                    |
| TRL 7 | System prototype operational                 | Near-final system demonstrated in operational setting            |
| TRL 8 | System complete and qualified                | Product deployed and performing in real-world conditions         |
| TRL 9 | Actual system proven in use                  | Product deployed and performing in real-world conditions         |

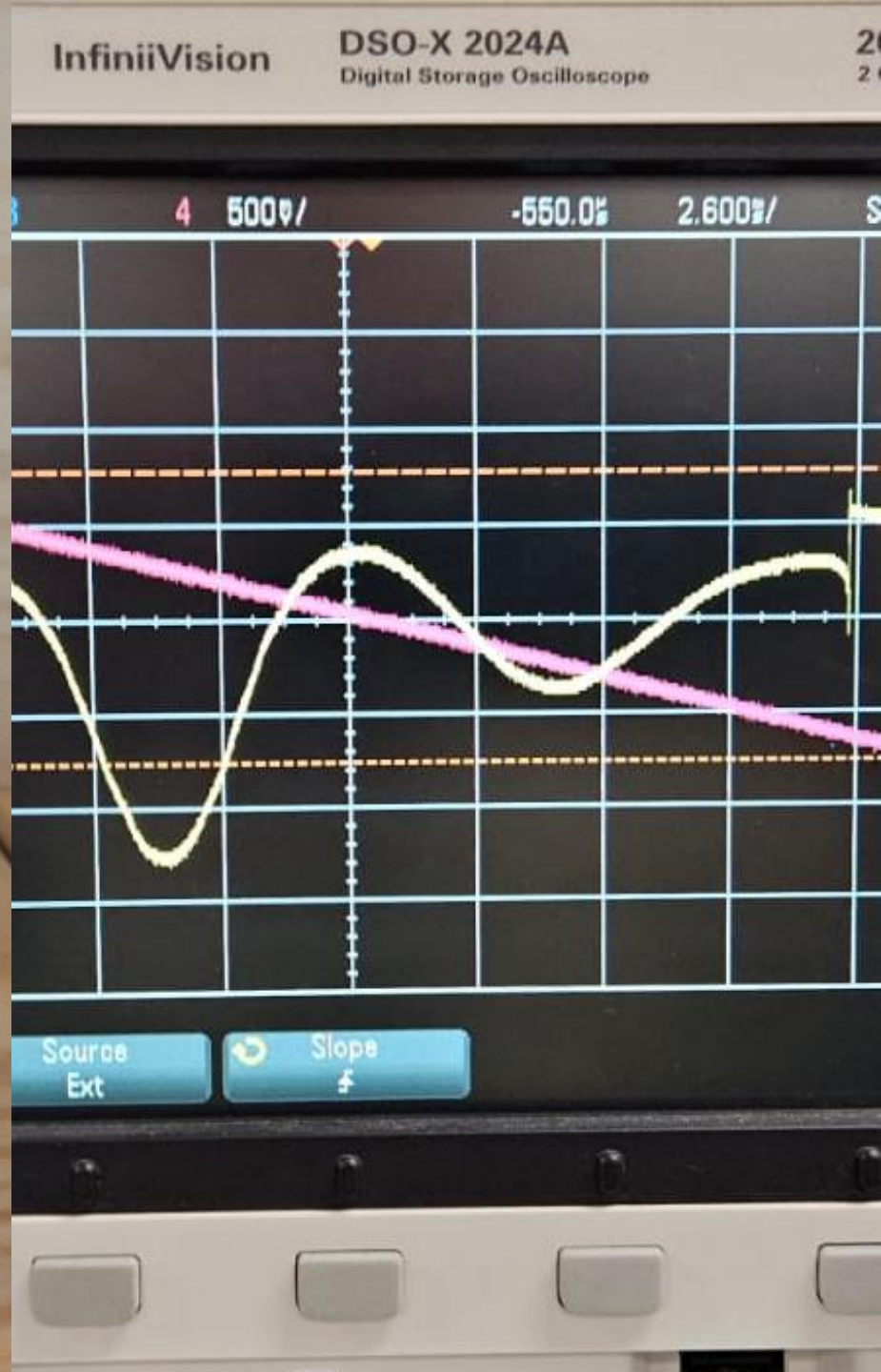
# What we do: Basic EPR protocol system TRL 3



# What we do: Coincidence counter TRL7



# What we do: Classical detector TRL7





# What we do: Single-photon detector TRL4

$$N = \frac{P \times T \times \lambda}{h \times c}$$

- Results
- APD
- Photon

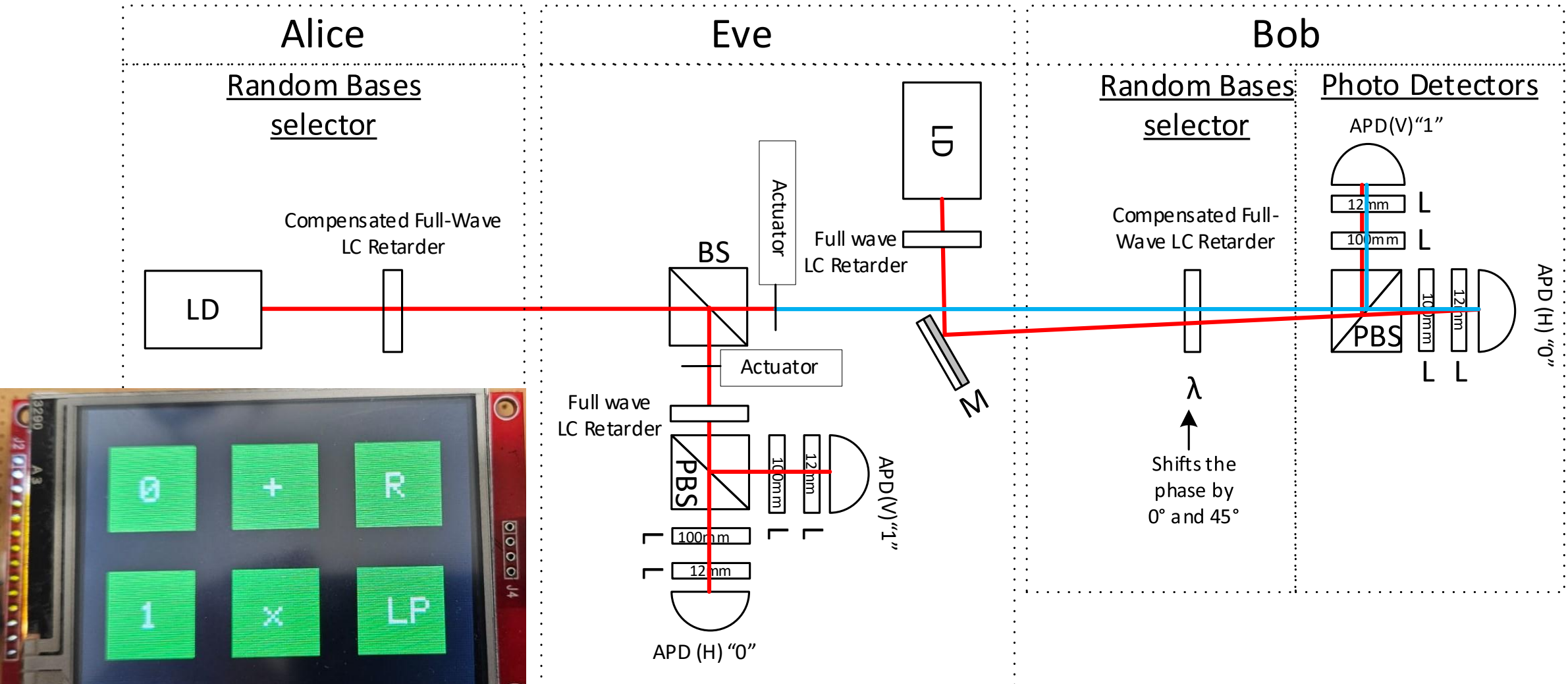
APD 8-150  
3650

C30902  
4



**What we do: ECDL**  
**TRL 7**

# What we do: Develop QKD demonstrator/laboratory teaching tool (TRL3)



# Technology Transfer Office (TTO): Why

## **Legal and Policy Compliance**

- South African universities follow the Intellectual Property Rights from the Publicly Financed Research and Development Act (IPR Act).
- This law requires institutions to manage IP arising from publicly funded research.
- The TTO ensures compliance with national regulations and institutional policies.

# Technology Transfer Office (TTO): Why

## Disclosure and Evaluation

- You must first **disclose your invention or innovation** to the TTO using their official forms.
- The TTO assesses whether the idea is **novel, commercially viable, and protectable** under South African IP law.

# Technology Transfer Office (TTO): Protecting IP

## IP Protection Strategy

- If the idea qualifies, the TTO initiates formal protection:
  - Patents for inventions and processes
  - Copyrights for creative works and software
  - Trademarks for brand identity
  - Trade secrets for confidential know-how
- They work with legal experts to file applications with the Companies and Intellectual Property Commission (CIPC) or international bodies if needed.

# Technology Transfer Office (TTO): Protecting IP

## Ownership and Benefit Sharing

- IP developed at CPUT is typically owned by the university, but inventors are entitled to benefit-sharing:
- Revenue from licensing or commercialisation is shared with the creator(s)
- Policies ensure fair recognition and reward for contributors

# Technology Transfer Office (TTO): Protecting IP

## Commercialisation Support

- The TTO helps translate IP into real-world impact by:
  - Connecting inventors with industry partners
  - Supporting licensing agreements, spin-off companies, or joint ventures
  - Advising on business models, market entry, and funding opportunities

# Technology Transfer Office (TTO): Protecting IP

## Training and Awareness

CPUT's TTO offers workshops, consultations, and resources to educate researchers and students about IP rights, protection processes, and commercialization pathways.

# Technology Transfer Office (TTO): Funding Options

## Internal Innovation Seed Funding

- CPUT may offer internal grants to support early-stage research and development.
- These funds help with:
  - Prototype development
  - Market validation
  - IP protection costs (e.g., patent filing)

# Technology Transfer Office (TTO): Funding Options

## National IP and Innovation Funds

- The TTO connects researchers with external funding bodies, including:
- National Intellectual Property Management Office (NIPMO): Offers IP protection and commercialization support for publicly funded research.
- Technology Innovation Agency (TIA): Provides seed funding, development grants, and support for spin-offs.
- Department of Science and Innovation (DSI): Funds strategic research and innovation projects.

# Technology Transfer Office (TTO): Funding Options

## Industry Collaboration and Licensing Revenue

- The TTO facilitates industry partnerships that may include:
  - Co-development funding
  - Sponsored research
  - Licensing deals with revenue-sharing

# Technology Transfer Office (TTO): Funding Options

## Student Innovation and Entrepreneurship Grants

- Students with promising ideas may qualify for:
  - Entrepreneurship competitions
  - Innovation challenges
  - Youth-focused funding schemes linked to CPUT or national programs

# Spin-off vs licensing

## The conventional view

|              | Licence                                      | Spin-out                                               |
|--------------|----------------------------------------------|--------------------------------------------------------|
| Effort       | Relatively easy<br>Do the deal and that's it | Masses of work as Shareholder,<br>director, consultant |
| Speed        | Quick and easy                               | Long hard slog                                         |
| Cost         | Patent & legal costs                         | Find investors to capitalise the<br>company            |
| Returns      | Only Income                                  | Capital Gain & Income                                  |
| Involvement  | Only at the start                            | Right in the heart of the action                       |
| Satisfaction | Not much - lose attachment                   | Masses - 'I built a business'                          |
| Risk         | Not much                                     | Enormous, Gaol                                         |
| Fun          | Not much they have the fun                   | Fantastic - the cut and thrust of<br>the board room    |
| Pain         | Easy ride                                    | See above                                              |

# Spin-off vs licensing

## An alternative view

|              | Licence                                            | Spin-out                                        |
|--------------|----------------------------------------------------|-------------------------------------------------|
| Effort       | Support, questions, improvements                   | Just be a passive shareholder, leave them to it |
| Speed        | Evaluation, option, license, can take just as long | Set it up, get a manager, then sit back         |
| Cost         | Patent & legal - can be expensive                  | Who is investing? You?                          |
| Involvement  | Watch it every step of the way                     | Cut out by the company                          |
| Satisfaction | My idea is everywhere                              | It was all a bit embarrassing actually          |
| Risk         | IP, warranties                                     | Company protects you                            |
| Fun          | Sit back and watch                                 | Extended bitterness                             |
| Pain         | They ripped me off                                 | Just great fun                                  |

# Spin-off vs licensing

|              | Spin-off                | Start-up                                  |
|--------------|-------------------------|-------------------------------------------|
| Created by   | University              | Outside Univ.                             |
| Technologies | Owned by the University | Licensed to the start-up<br>by University |
| Financed by  | the University          | Outside funder                            |
| Managed by   | University staff        | Outside Univ.                             |

# Creating your own business

| Structure Type                    | Registration Body | Notes                                                                 |
|-----------------------------------|-------------------|-----------------------------------------------------------------------|
| Private Company (Pty Ltd)         | CIPC              | Most popular structure; limited liability; suitable for most startups |
| Personal Liability Company (Inc.) | CIPC              | Used by professionals like lawyers, doctors, accountants              |
| Non-Profit Company (NPC)          | CIPC              | For charitable, religious, or cultural purposes                       |
| Public Company (Ltd)              | CIPC              | For companies listed or intending to list on a stock exchange         |
| State-Owned Company (SOC Ltd)     | CIPC              | Owned by government; still active for public services                 |
| Sole Proprietorship               | SARS              | No formal registration with CIPC; register for tax with SARS          |
| Partnership                       | SARS              | No CIPC registration; governed by partnership agreement and tax rules |

Companies and Intellectual Property Commission (CIPC)

# Summary

- From Idea to product is a journey
- While talking to your possible clients/investors, keep your secrets to yourself.
- You must register your product with the TTO
- The TTO will help to protect your product.
- Decide which route to follow: Spin-off vs Licensing
- This will direct you to funding options.



# Questions



# Thank you



# Picture of current team

