

Bridge Science and Industry

Notes on technology transfer from robotics research

Utku Çulha

CS 491/2 Senior Design Project – Bilkent University



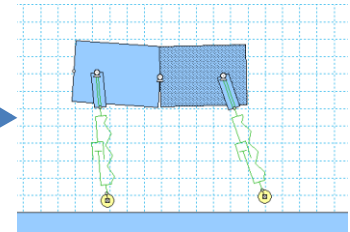
B.Sc. 2009 – Computer Engineering
Bilkent University



Vis. Sch. 2011 – NanoLab
Carnegie Mellon University



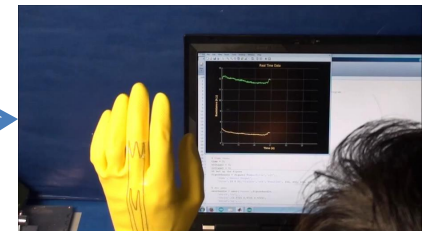
M.Sc. 2012 – Computer Engineering
Bilkent University



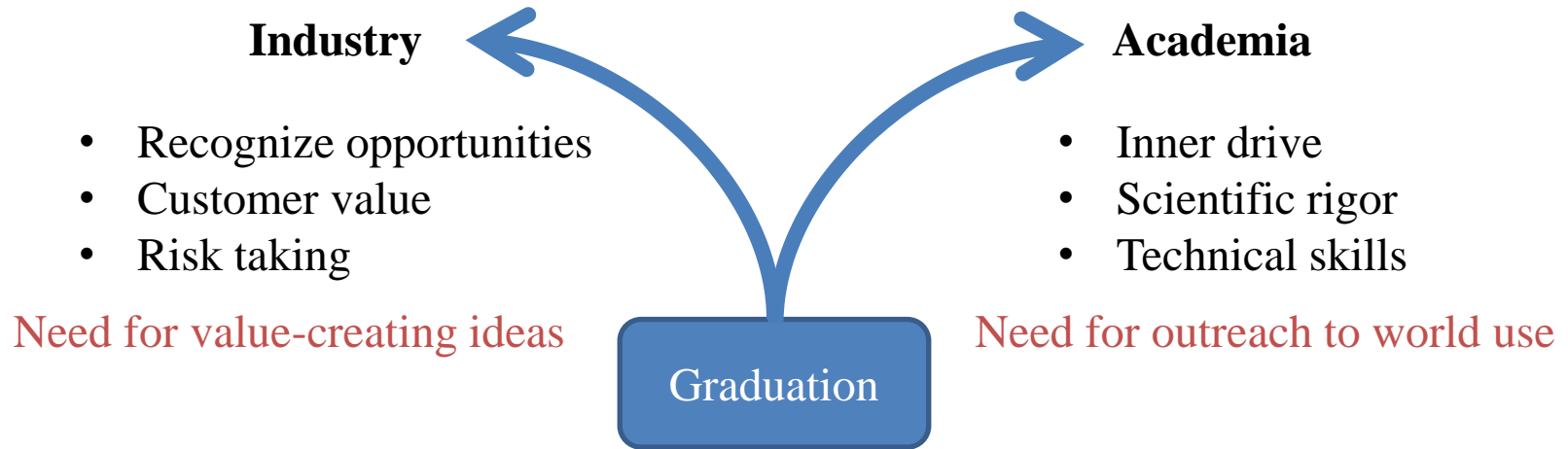
Res. Asst. 2015 – Information Engineering
University of Cambridge



Dr.Sc. 2016 – Mechanical Engineering
ETH Zurich



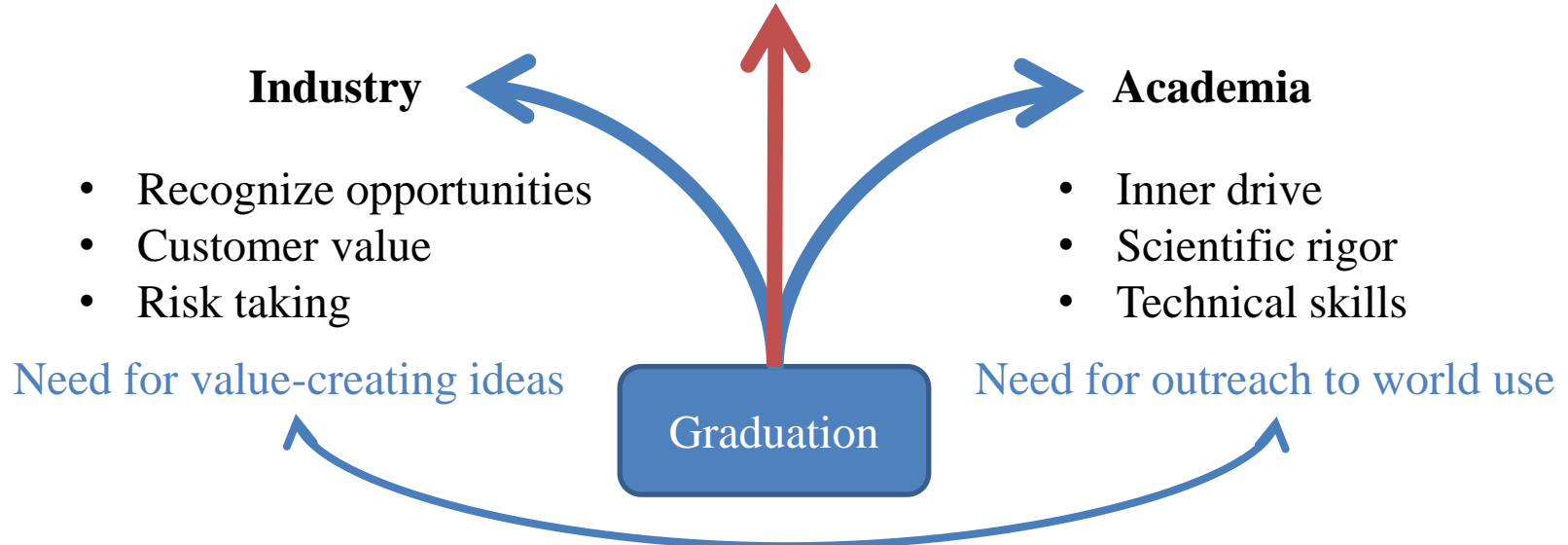
Career Choice



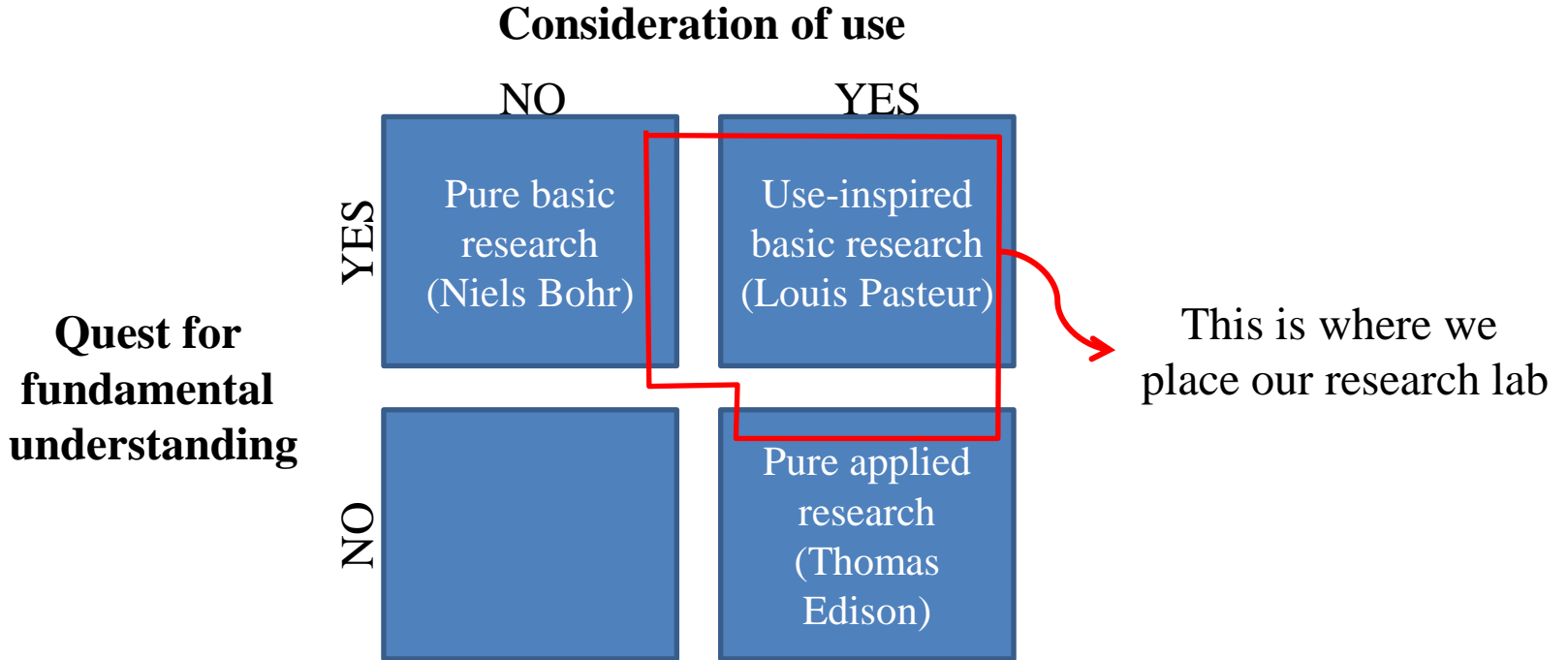
Career Choice

Academic Entrepreneurship

- Combine the skill sets
- Benefit from both worlds

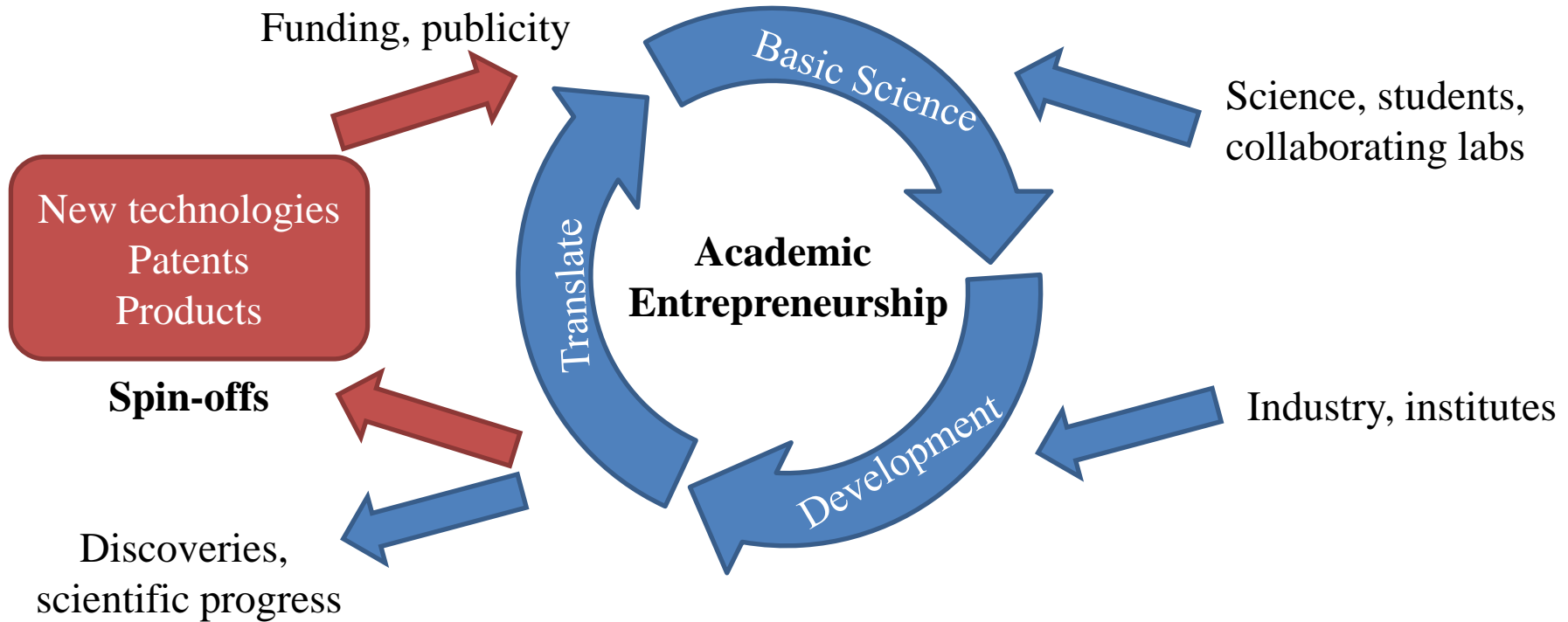


Research Types



Adopted from Donald Stokes, "Pasteur's Quadrant: Basic Science and Technology Innovation", 1997

A Research Lab Anatomy

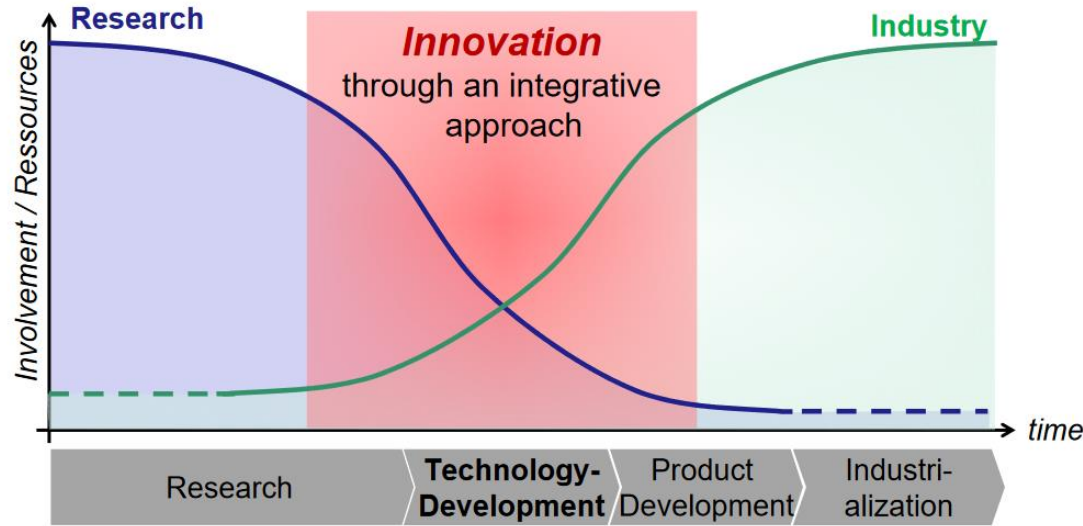


How to Start a University Spin-off?

- Requires the mind-set of an academic entrepreneur
- Not straightforward
- Depends on university regulations
- You are not alone: Technology Transfer Offices

Technology Transfer Offices

Vision - Bridging Science and Industry



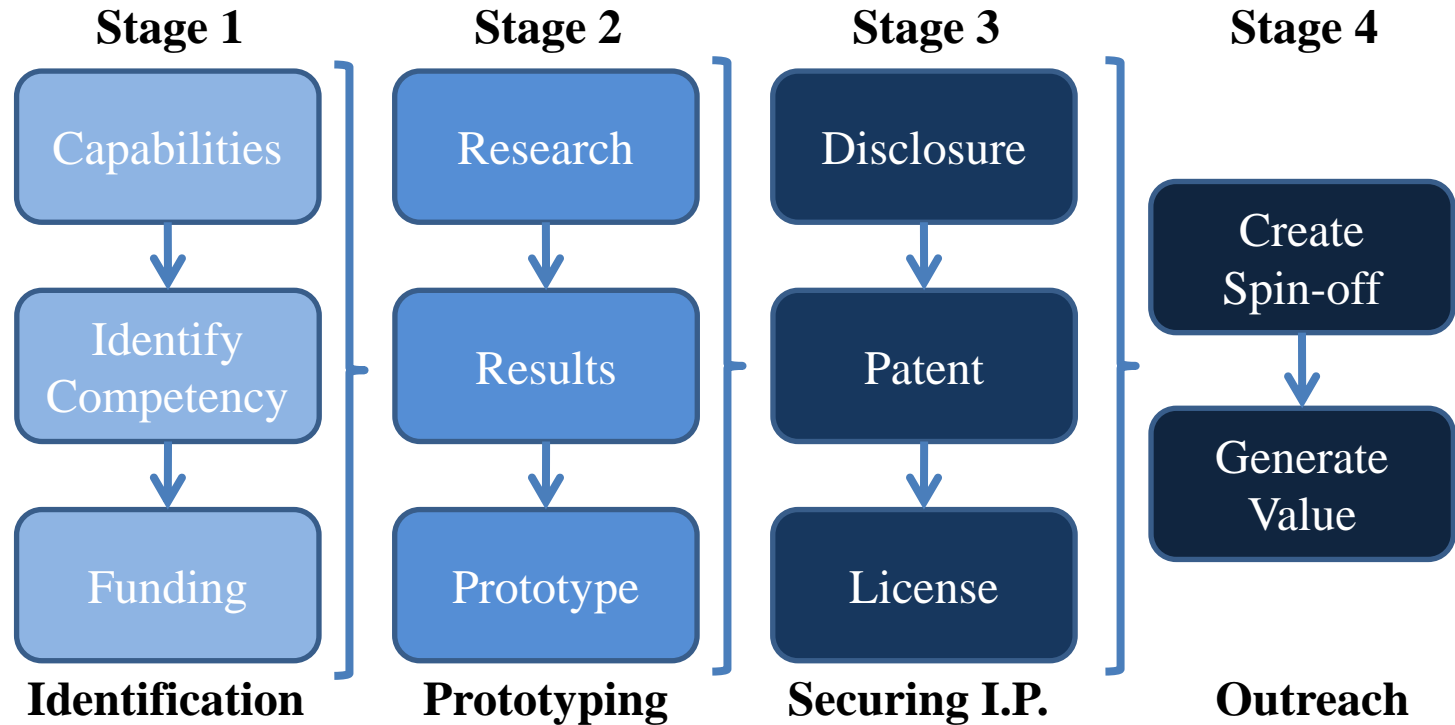
Bilkent University
Technology Transfer Office

Value Chain



Adopted from the ETH Innovation and Entrepreneurship Laboratory presentation, 2012

A Multistage Holistic Model*



*Pattnaik, P.N., & Pandey, S.C., University Spinoffs: What, Why, and How?, *Technology Innovation Management Review*, 4(12), 44-50, 2014.

The Road to Spin-off

Stage 1

Capabilities

Define what research will be done and how

Identify
Competency

Contact Technology Transfer Office

Funding

Self or university, corporate or public funding

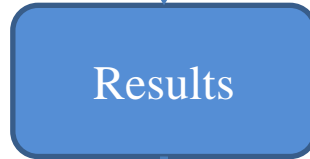
Identification

The Road to Spin-off

Stage 2



Conduct research based on capabilities



Test and confirm research



Generate the first reliable and working unit

Prototyping

The Road to Spin-off

Stage 3

Disclosure

Protect the intellectual property

Patent

Is the invention patentable?

License

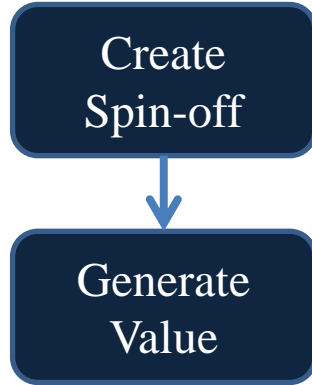
What can be licensed?

Securing I.P.

The Road to Spin-off

Stage 4

Create
Spin-off



```
graph TD; A[Create Spin-off] --> B[Generate Value];
```

The bridge has been established

Generate
Value

Win-win scenario

Outreach

Examples from Own Research

- Prolog Ltd. – Learning Digital Stethoscopes
GE402 Project to patent producing company
- NooNee Ltd. – Chairless chairs
ETH Spin-off that sells products to BMW and Audi
- In Progress – Lettuce Picking Robot Hands
Farming 1 Million Lettuce in Cambridge

eXist Ltd. to Prolog Ltd.



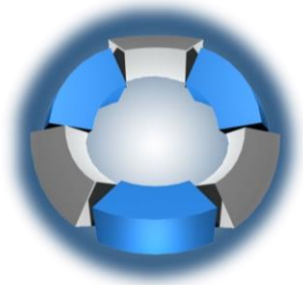
eXist Ltd. to Prolog Ltd.

GE401-402 2009 Project: StethoMemoria



<http://ge402.bilkent.edu.tr/OLD/exist/>

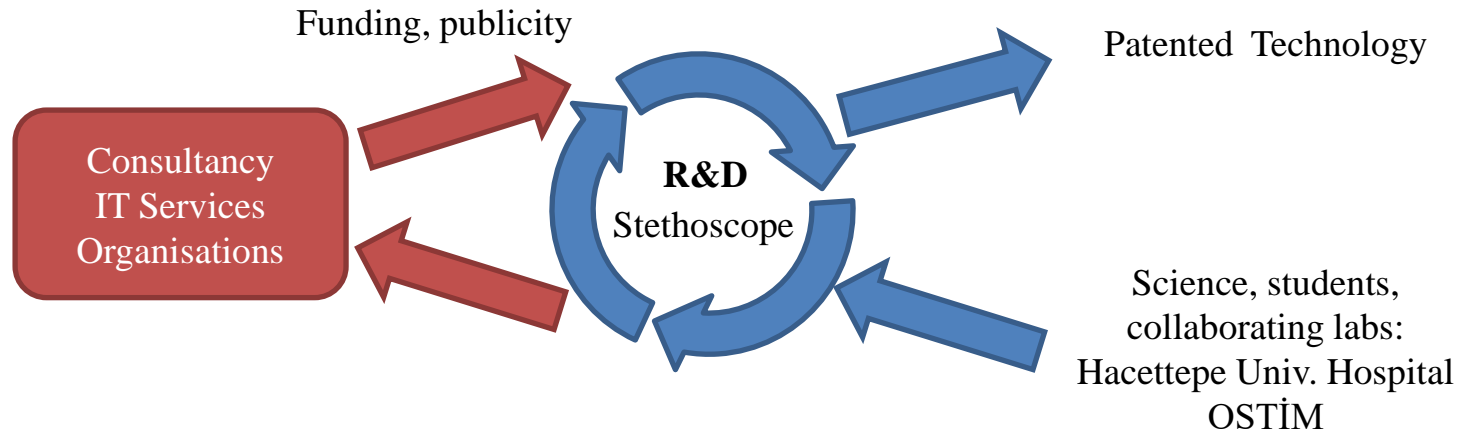
eXist Ltd. to Prolog Ltd.



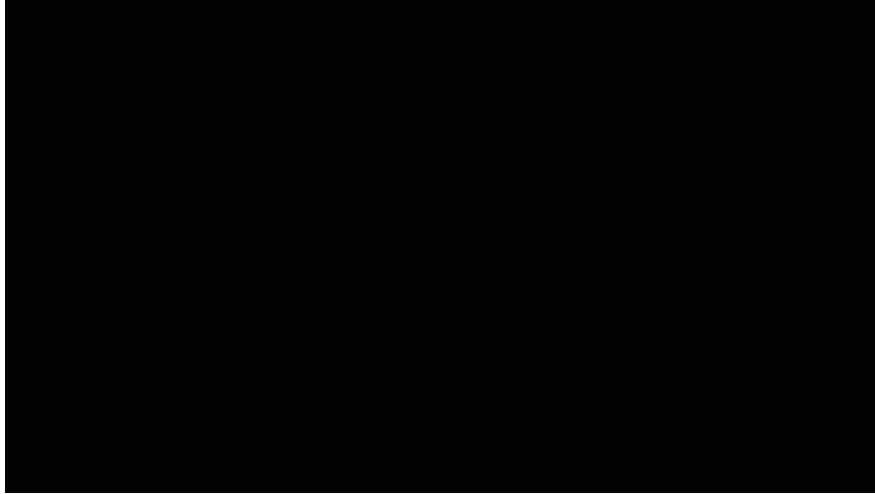
Prolog Ltd. was founded at Bilkent Cyberpark in 2010

Funded by:

- USIM (Üniversite Sanayi İşbirliği Merkezi) – Bilkent University
- Teknogirişim – TC Bilim, Sanayi ve Teknoloji Bakanlığı



Locomotion Research in BIRL



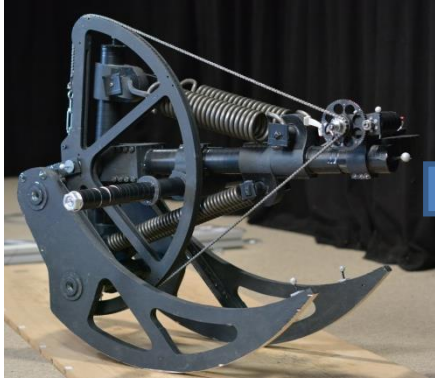
Cargo: Efficient (distance vs power) locomotion

ETHop: Spring-dampers on hopping height

More in: <http://divf.eng.cam.ac.uk/birl/>

Chairless Chair

Capabilities on locomotion efficiency



Simpler, competent use value

NooNee Ltd.



ETH Spin-off

Funded by Venture Capitals

Patents pending

Customers: BMW and AUDI

More in: <http://www.noonee.com>

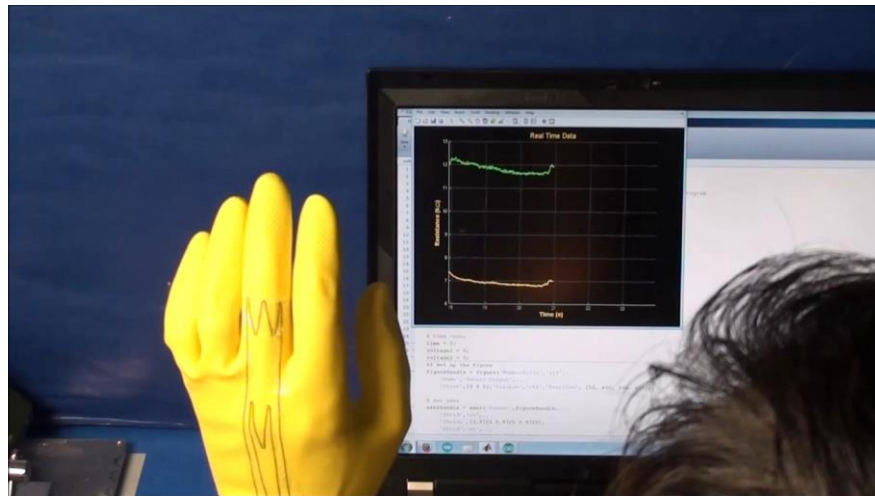
Hand Research in BIRL

Enhancement of finger motion range with compliant anthropomorphic joint design

Utku Çulha and Fumiya Iida

2015

Department of Mechanical and Process Engineering, ETH Zurich, Switzerland
Biologically Inspired Robotics Laboratory, University of Cambridge, United Kingdom



Human like soft joints, tendons allow flexibility

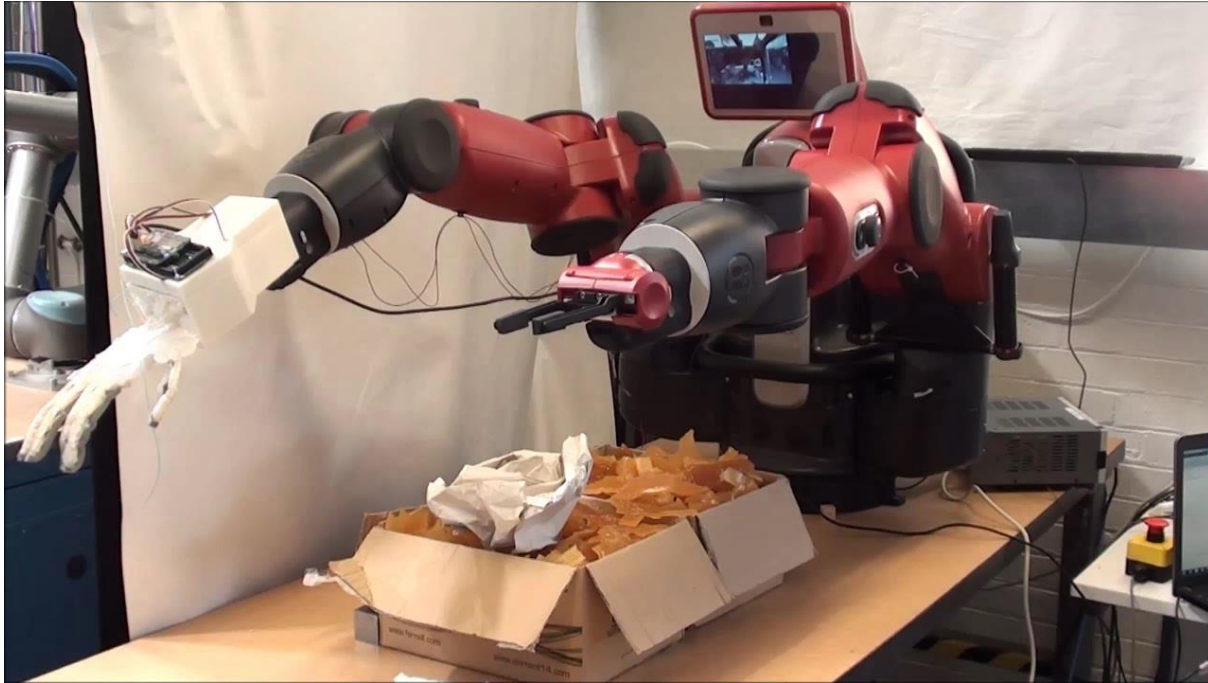
Soft sensors gather tactile and position information

More in: <http://divf.eng.cam.ac.uk/birl/>

Lettuce Picking

How Lettuce is Picked and Packaged
at Tanimura & Antle Farm

Work in Progress



? Cambridge Spin-off

Funding search continues

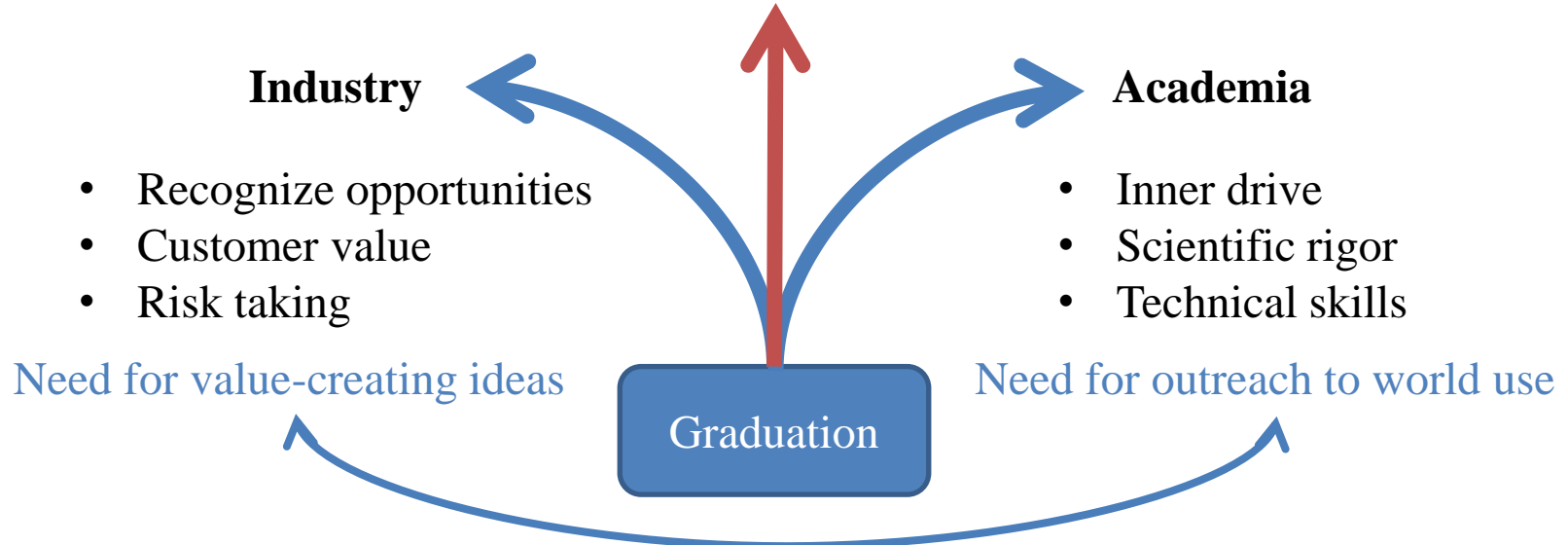
Patents pending

Customers: Sainsbury's

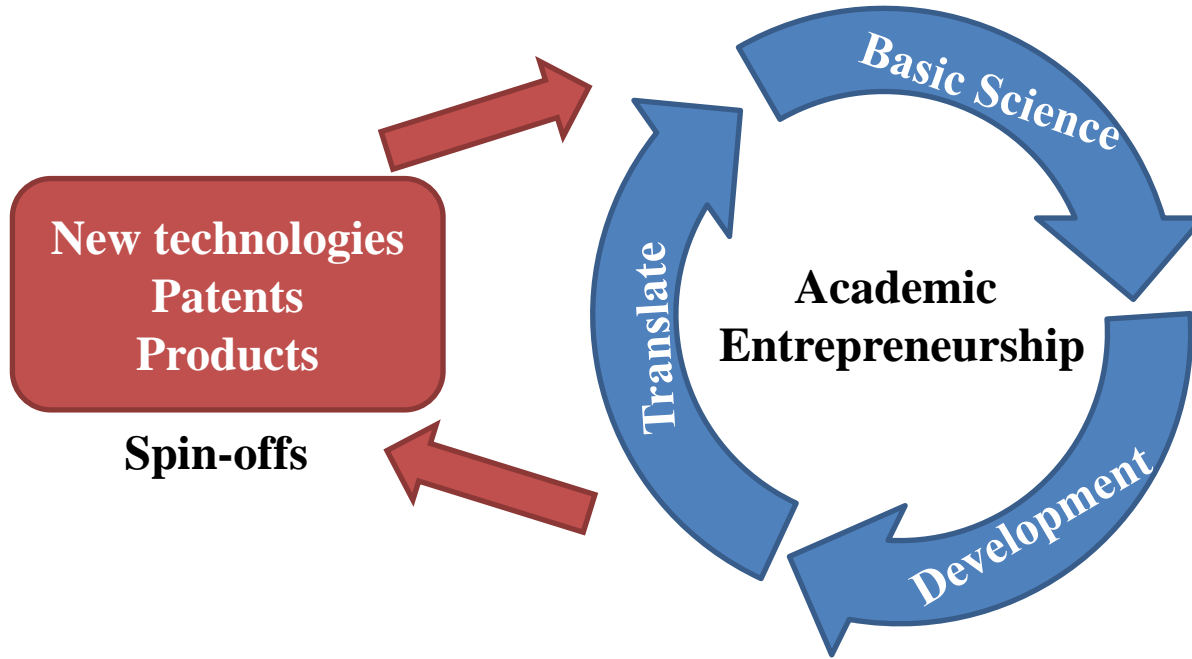
Summary

Academic Entrepreneurship

- Combine the skill sets
- Benefit from both worlds



Thank You



Quiz question:

What are the four stages that paved the road to university spin-off?