



Kruisbestuiving tussen grote bedrijven en spinoffs

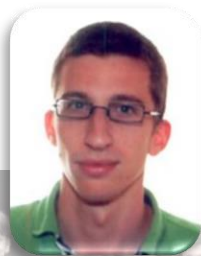
Prof. Dr. Bart De Moor
STADIUS , ESAT, KU Leuven

Content

- My research group STADIUS/ESAT/KU Leuven
- Our Technology Transfer Office LRD
- My spinoffs, large companies, lessons learned
 - IPCOS
 - DATA4s
 - TML
 - Cartagenia
 - Trendminer
 - Silicos
 - Ugentec
- Conclusions



Marc Moonen



Alexander Bertrand



Jan Aerts



Bart DeMoor



Panos Patrinos



Yves Moreau



Johan Suykens



Sabine VanHuffel



Lieven DeLathauwer
KULAK



Bart Van Rumste
KULLOC-Geel



Toon van Waterschoot
KULLOC-Geel

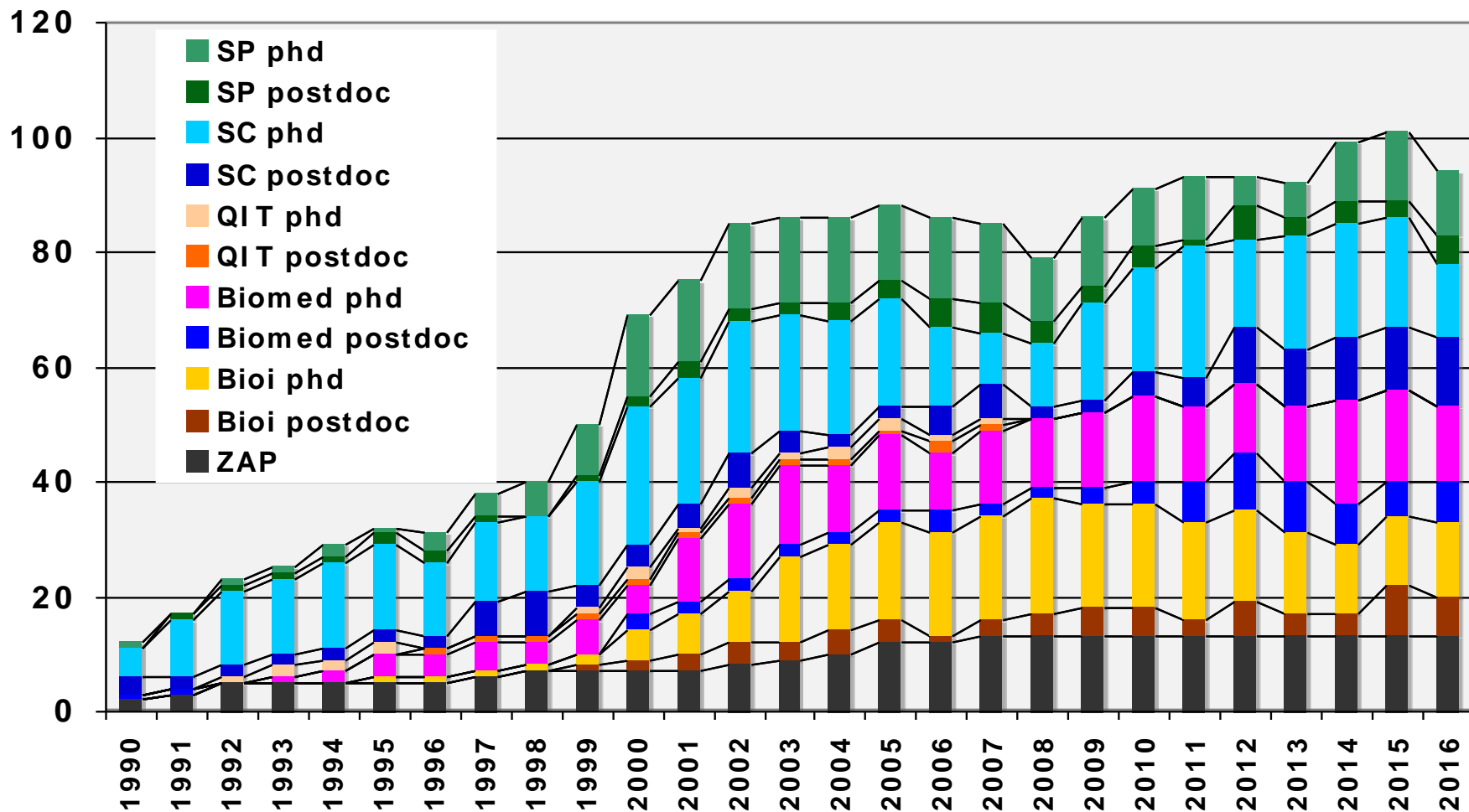


Jos De Brabanter
KULLOC-Gent



Joos Vandewalle
Em. Professor

PhDs, postdocs, professors (updated 04/12/2015)



STADIUS - Alumni



J.M. Rabaey
Univ. of California
Berkeley, CA, USA



T. De Bie
University of Bristol, UK



K. Pelckmans
Uppsala Univ.
Sweden



B. De Schutter
TUDelft



G. Leus
TUDelft



M. Verhaegen
TUDelft
The Netherlands (NL)



D. Thierens
Univ. Utrecht (NL)



J. Vanderschoot
Univ. Leiden (NL)

L. Vandenberghe
UCLA, CA, USA



F. Verstraete
Ugent, Belgium
(Odysseus fel.)



P. Antal
Budapest Univ.
Hungary



Mustak E. Yalcin
Istanbul Tech.Univ.
Turkey

R. Jain
UCLA, CA, USA



J. Chen
University of Texas
Med. Branch
Galveston, TX, USA



T. Laudadio
IAC-CNR
Bari, Italy



I. Barhumi
University, Al-Ain
United Arab Emirates



S. Tan
Peking University,
China

J.J. Espinosa
Oviedo
National Univ.
of Colombia



S. Doclo
University of Oldenburg
Germany

J.A. Muñoz
Hernández
University of
Tolima
Colombia



S. Xavier-de-Souza
Federal University of
Rio Grande do Norte,
Brazil

O. Barrero
University of
Ibagué
Colombia

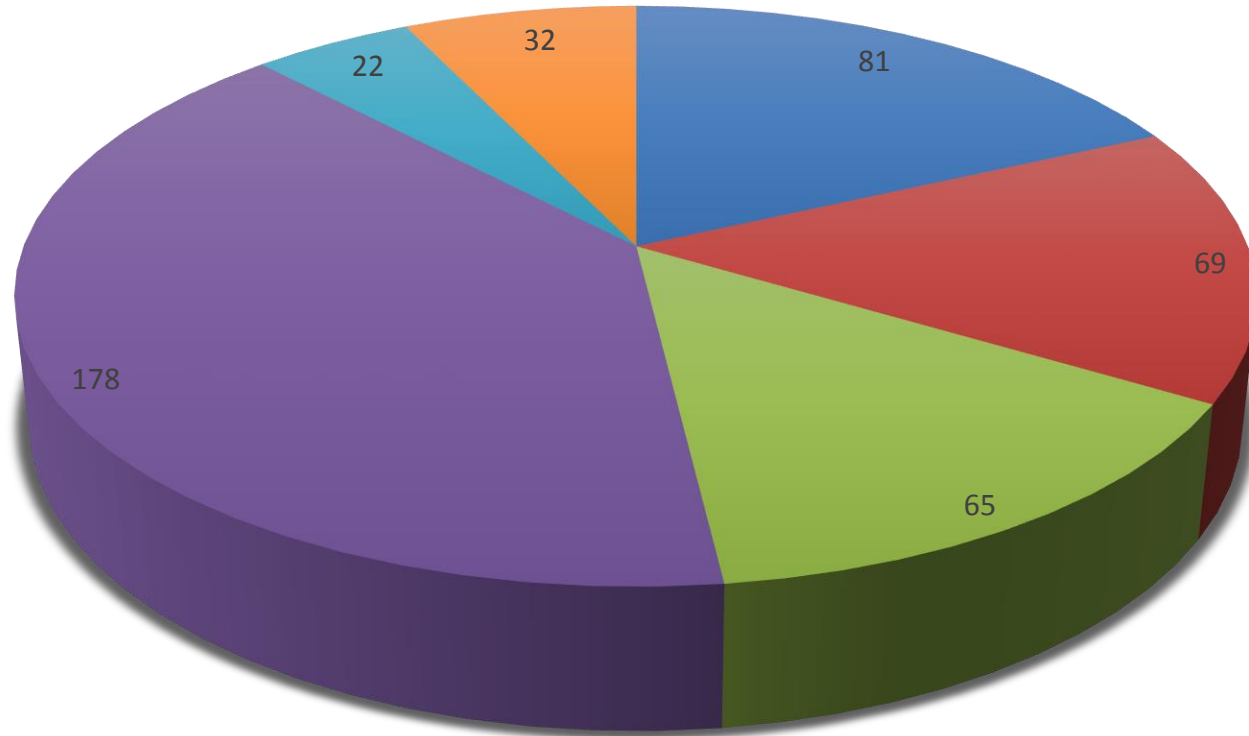


L. Lukas
Catholic University of Indonesia
Atma Jaya, Indonesia



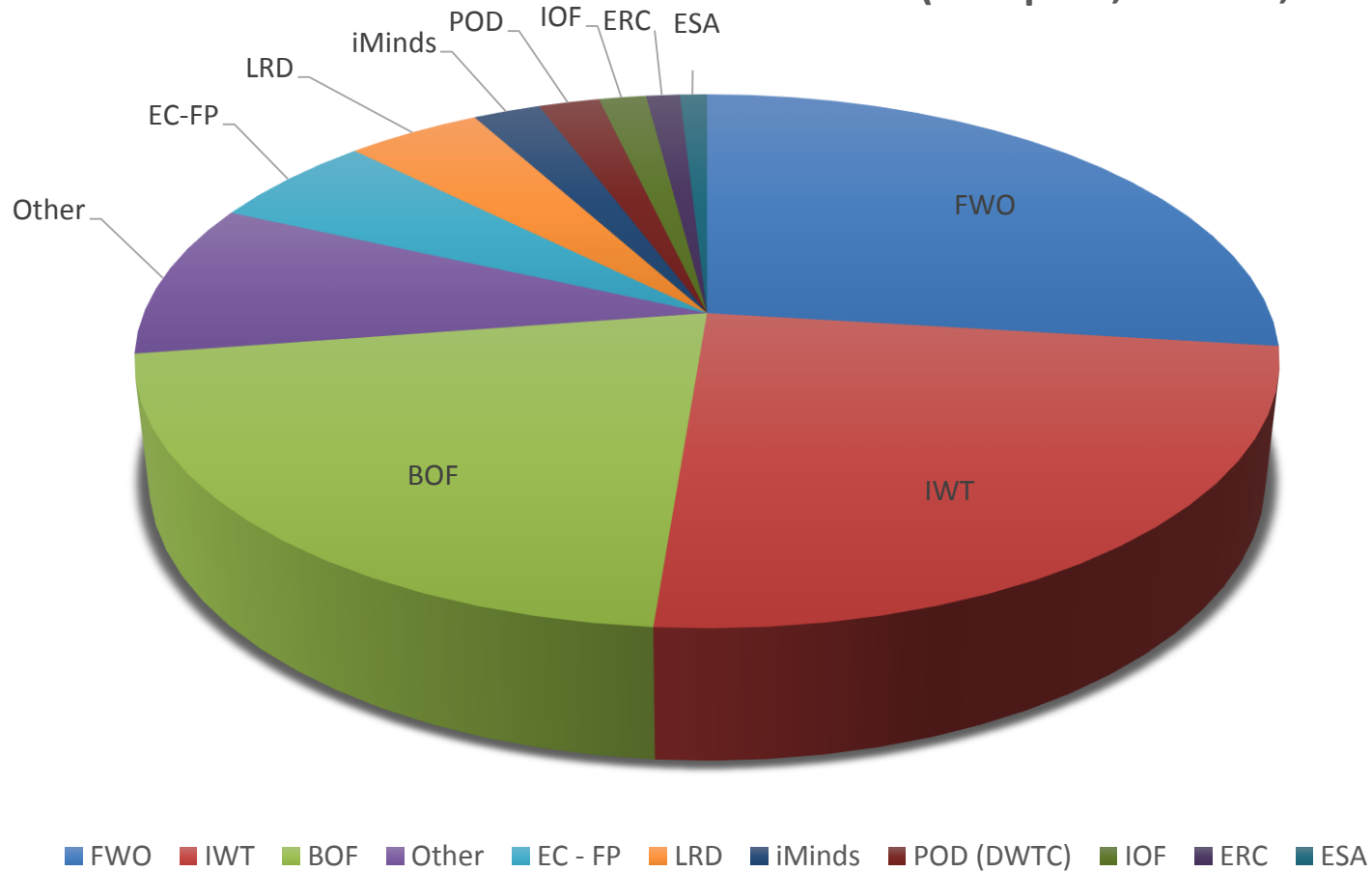
Former PhD students SCD in academic positions worldwide

Current/Accepted/Past Projects – Length in months



■ 12 or less ■ 12-24 ■ 24-36 ■ 36-48 ■ 48-60 ■ Longer than 60

Projects Funding Sources (Accepted, Current, Past Projects)



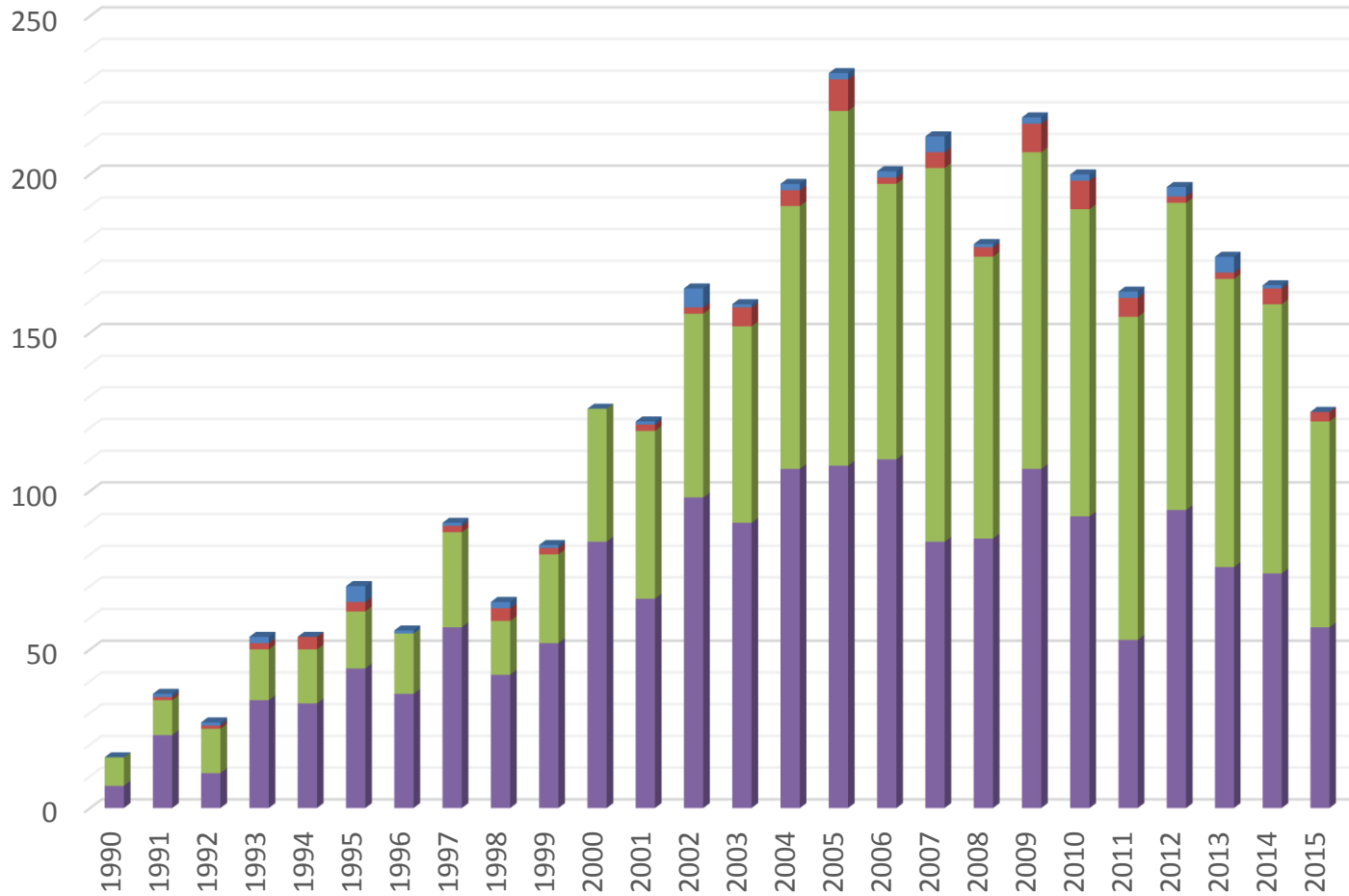
Turn over ('small sme')

- 2010: 5.911.277 euro
- 2011: 5.626.785 euro
- 2012: 5.470.918 euro
- 2013: 5.857.540 euro
- 2014: 6.863.446 euro
- 2015: 5.516.867 euro
- 2016: 5.018.127 euro

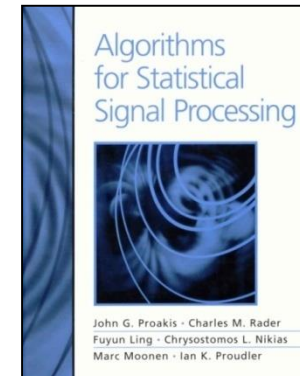
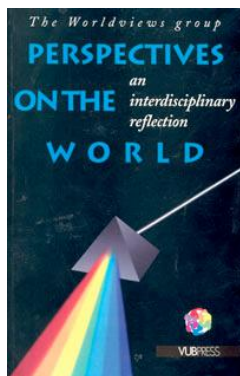
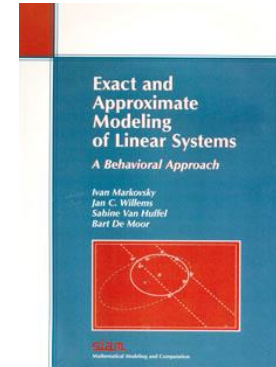
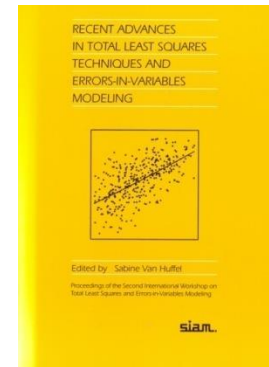
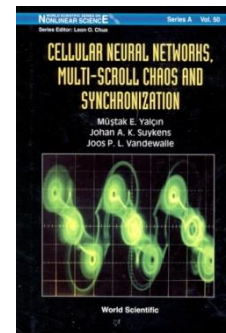
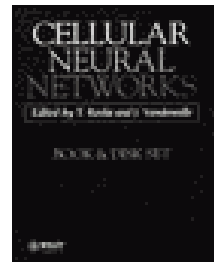
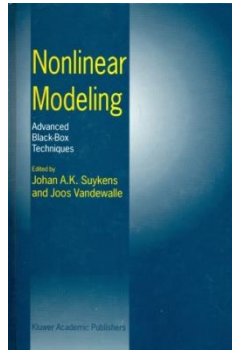
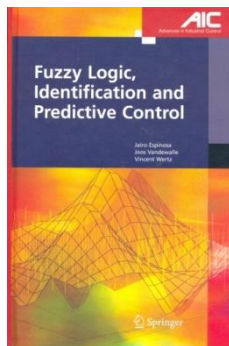
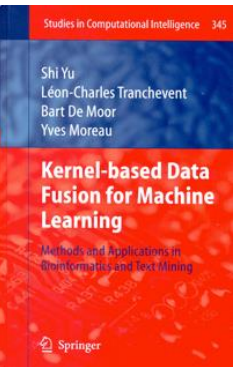
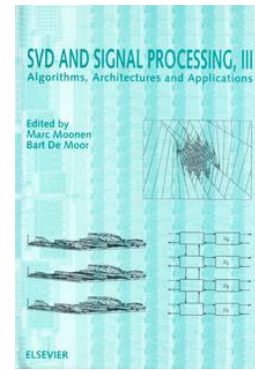
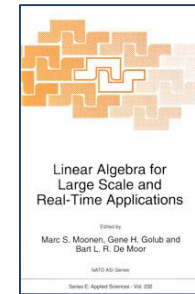
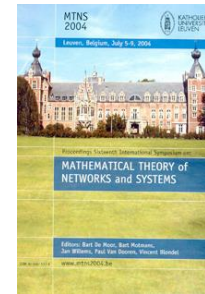
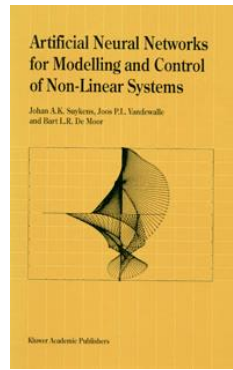
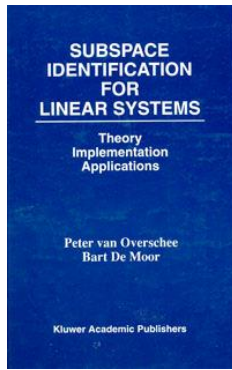
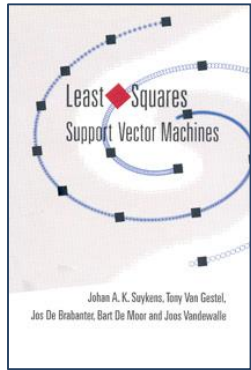
Positive correlation in excellence for fundamental research, strategic basic research, direct contract research, tech transfer and spin-off creation !!!

STADIUS Publications per year

■ Conference Papers ■ Journal Papers ■ Contribution to Books ■ Books



BOOKS



STADIUS 'Output': Awards

IEEE Fellows

1992 Joos Vandewalle
2004 Bart De Moor
2007 Marc Moonen
2009 Sabine Van Huffel
2015 Lieven De Lathauwer
2015 Johan Suykens



Bart L.R. De Moor
FWO Excellence Award
dr. De Leeuw-Damry-Bourlart
2010



Sabine Van Huffel,
Honorary doctorate
TU /Eindhoven NL, 2013

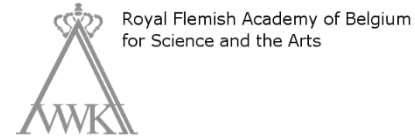
Siemens Award
Alcatel-Bell Award (x2)
IBM Award
...



Johan Suykens
VUB Leerstoel
2012-2013

AWARDS

IEEE Fellowships



IEEE Best Paper Awards



IEEE Gauss Award

IEEE Young Author Best Paper Award



INTERNATIONAL NEURAL NETWORK SOCIETY



IEEE Best Student Paper Award

Award at IEEE BioVis

EAMBES Fellowship



Martin Black Award

Fund for Scientific Research – Flanders, Siemens Prize (2x)

Alcatel Bell Award



International Neural Networks Society INNS

2000 Young Investigator

Celtic Excellence Award



BROWN

ELSEVIER

Elsevier Editors' Choice

Elsevier Best Paper Award

Fulbright Grante - Brown University

KU Leuven Research Council Award



Laureate of the Belgium Royal Academy of Science

ERCIM Cor Baayen Award



European Research Consortium for Informatics and Mathematics



Honorary Mention in the European Research Consortium

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Leuven Research and Development

- Founded in 1972
- Technology and knowledge transfer office of K.U.Leuven
- Bridge between university, industry and society
- Supports researchers
- Offers technologies to industry
- High level of budgetary and HR autonomy
- 'Business unit'



LRD: Mission

“Promoting and supporting knowledge and technology transfer between university and industry”



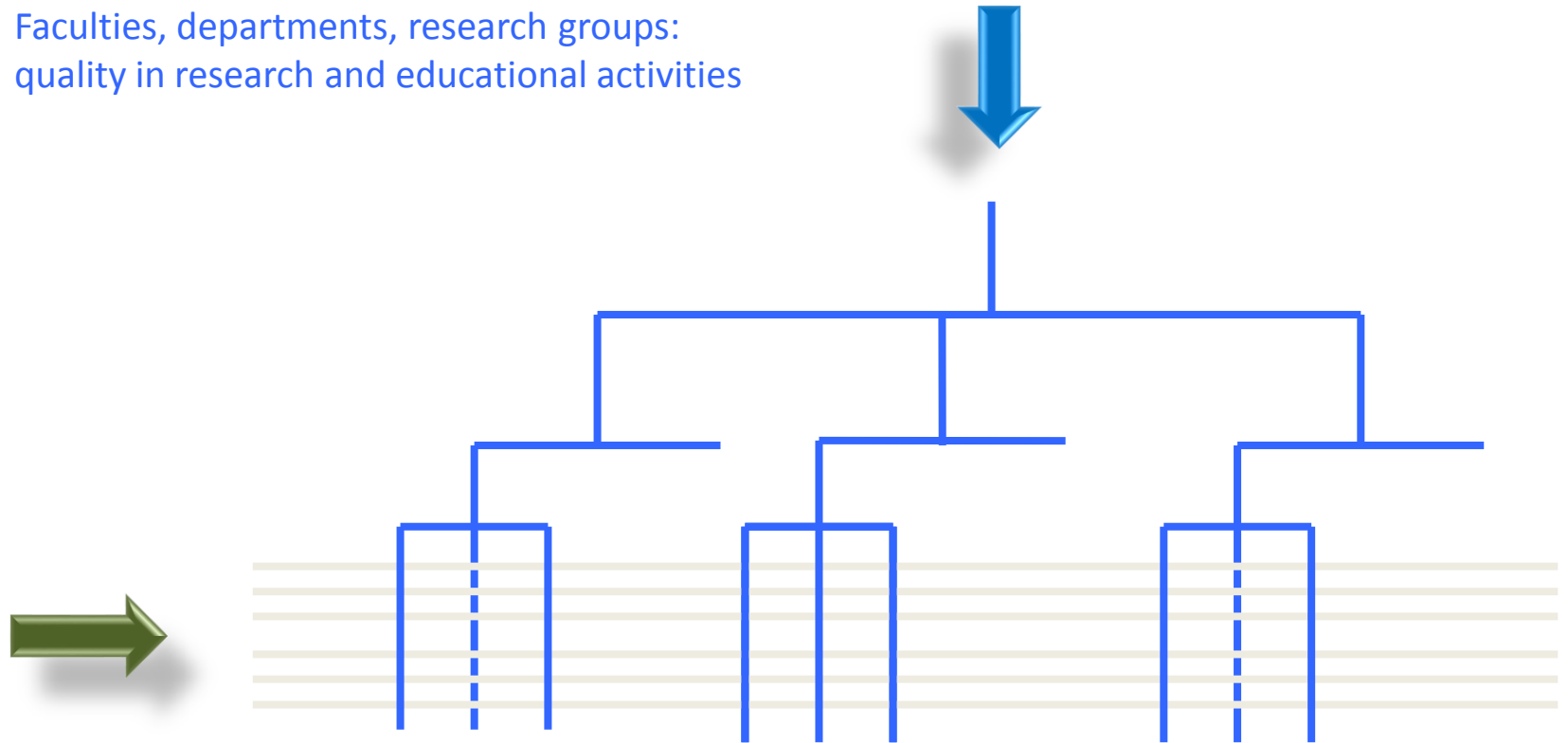
What is LRD?

- LRD consists of:
 - Central multidisciplinary staff
 - Supports researchers in knowledge and technology transfer
 - Research divisions
 - 1,340 researchers & 410 supporting
 - Embedded in university via matrix structure
 - Virtual organisations in which (groups of) researchers (from different faculties or departments) can group their applied research, commercial-industrial and exploitation activities.



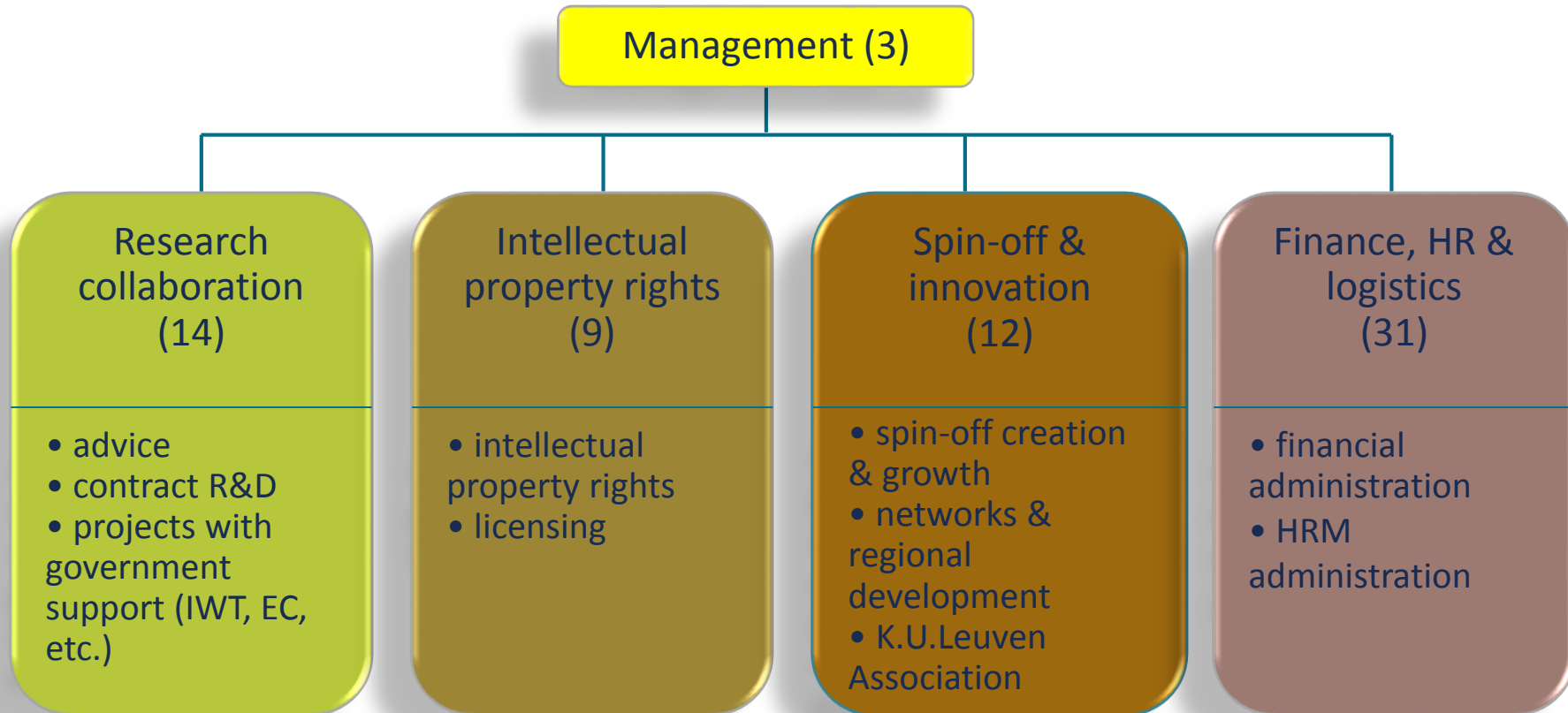
LRD research divisions

Faculties, departments, research groups:
quality in research and educational activities



LRD divisions/projects:
Contract and budgetary
autonomy and flexibility
incentives

Organisation



- Close interaction/collaboration between different units
- Regional and international networking

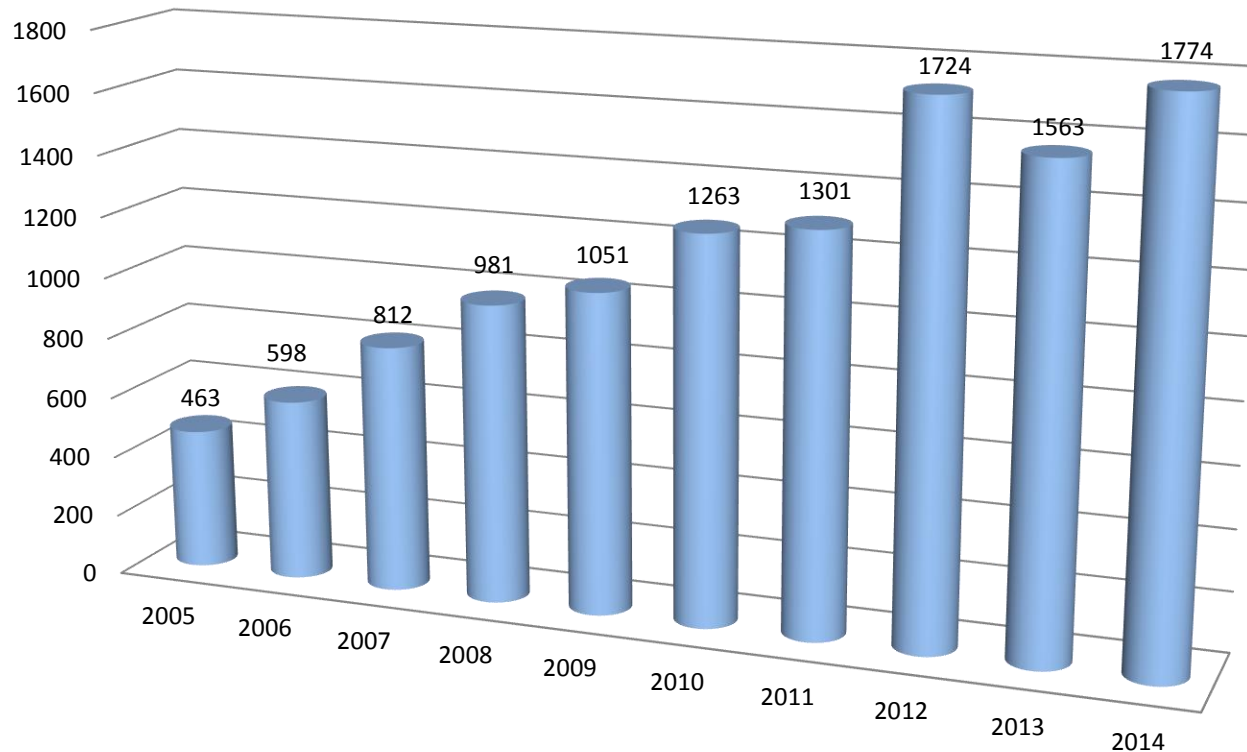
Research collaboration



- Incentives for researches:
 - Who gets what (after payment of costs)?
 - 8.5% LRD and 8.5% K.U.Leuven
 - Remaining (and largest) part of net profit flows back to research division
 - Incentive: 50% of net profit can go to individuals (rarely used)
 - What to do with built up reserves?
 - Expand research group
 - Invest in patents
 - Invest in spin-offs

Research collaboration

- 114 million euro income from research collaboration
- 1,774 new agreements (2014)



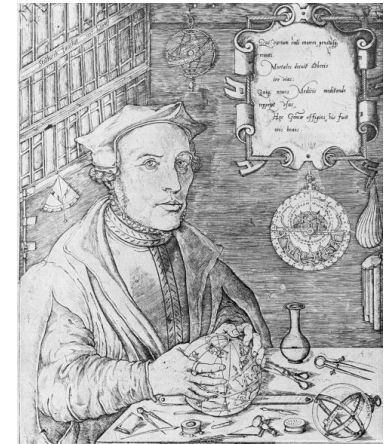
Spin-offs & innovation

- What do we do?
 - Developing business plans
 - Validating business models and the market
 - Offering legal support
 - Putting together a competent team
 - Finding investors
 - Finding infrastructure
 - Managing growth of spin-offs
 - Promoting valorisation and entrepreneurship
 - Stimulating regional development, networks and clusters



Incubation & seed financing

- Gemma Frisius Fund KU Leuven (GFF)
 - Seed capital for spin-off companies
 - GFF founded in 1997 & GFF II in 2002
 - At the end of 2009 GFF and GFF II merged into one single fund
 - Partners:
 - KU Leuven (20% of capital)
 - Two banks: KBC Private Equity (40%) and BNP Paribas Fortis Private Equity (40%)
 - Combination between:
 - Knowledge and technology transfer expertise (university)
 - Financial expertise (financial partners)
 - Not restricted to one technology domain
 - 27 million euro invested in 42 spin-off companies



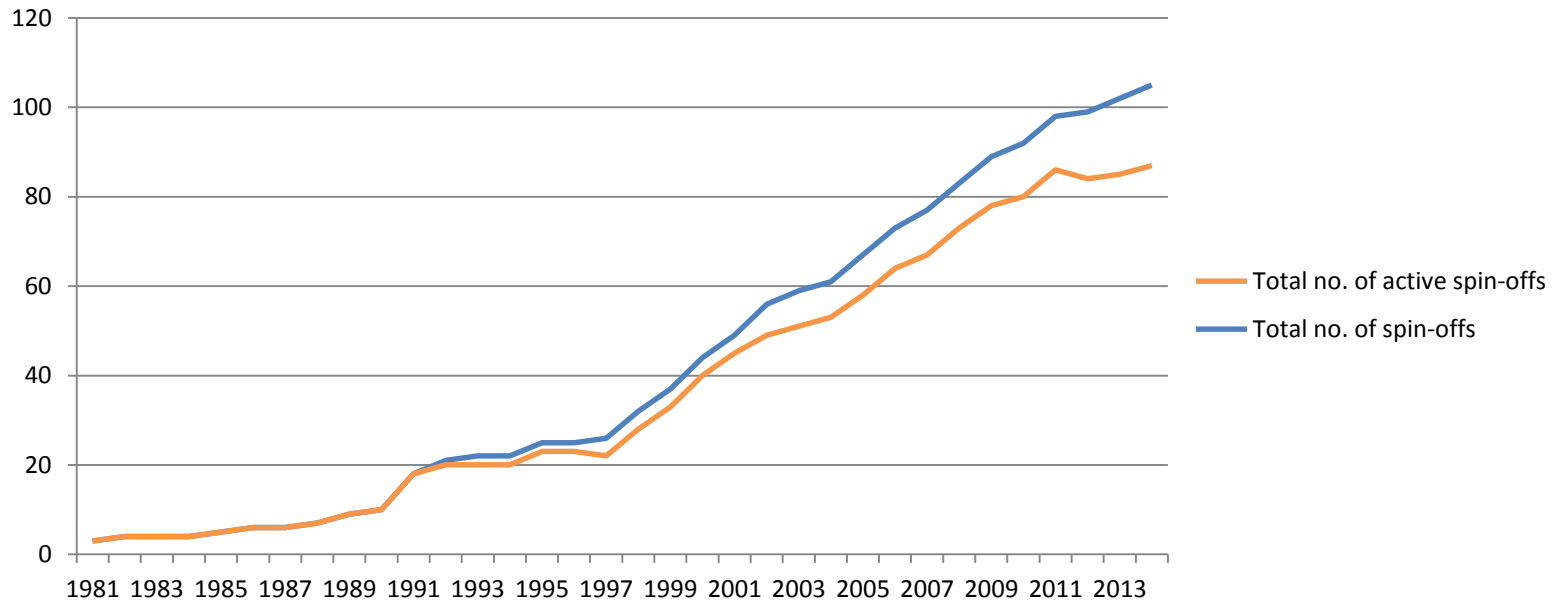
Spin-offs & innovation

- Incentives for researchers:
 - Return through shares & warrants
 - Realise a surplus value on shares
 - Valuation of intellectual property & knowledge depends on various factors:
 - Intellectual property and contracts brought in
 - Patent portfolio
 - Time-to-market
 - Team



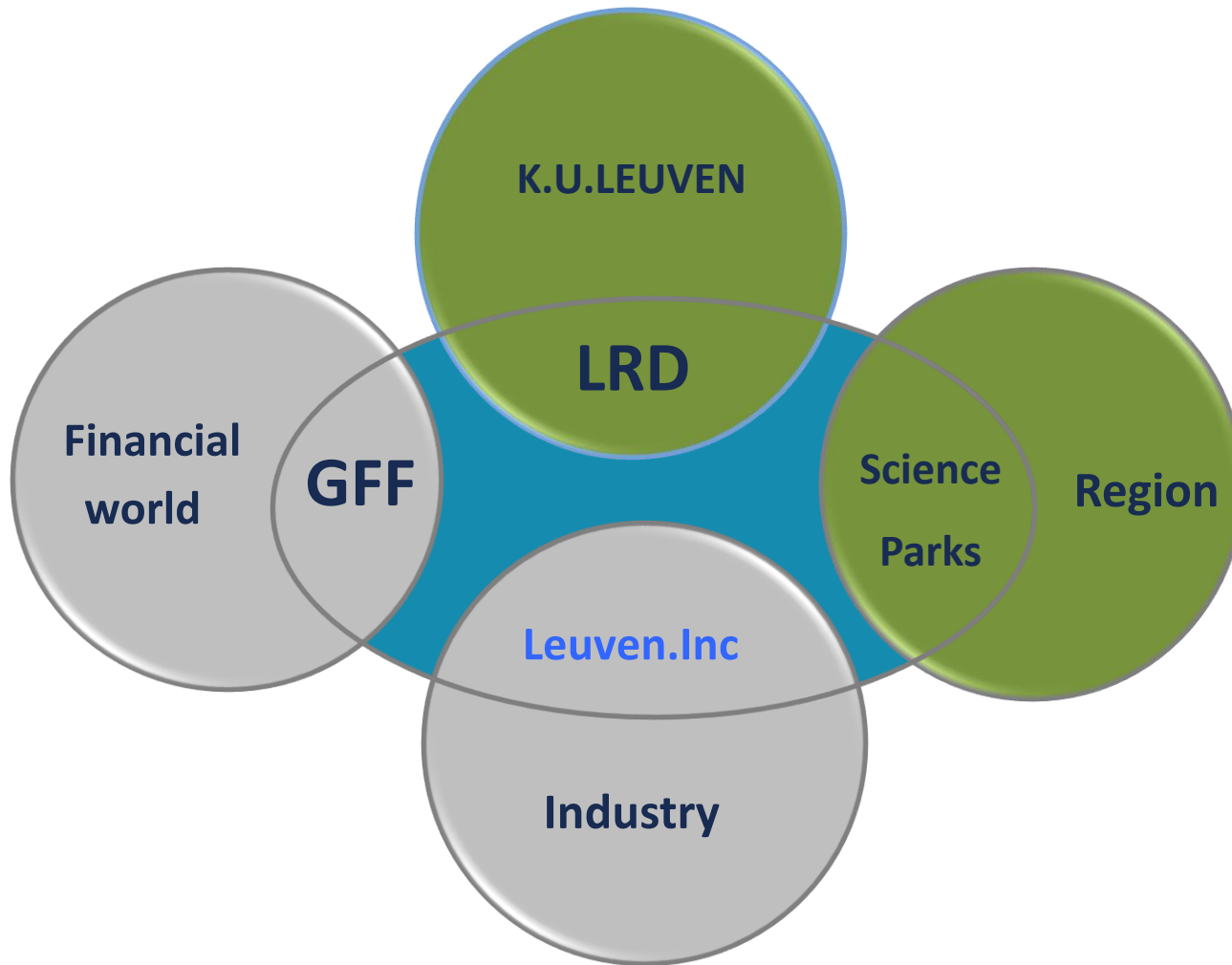
Spin-off companies

Cumulative number of spin-offs created



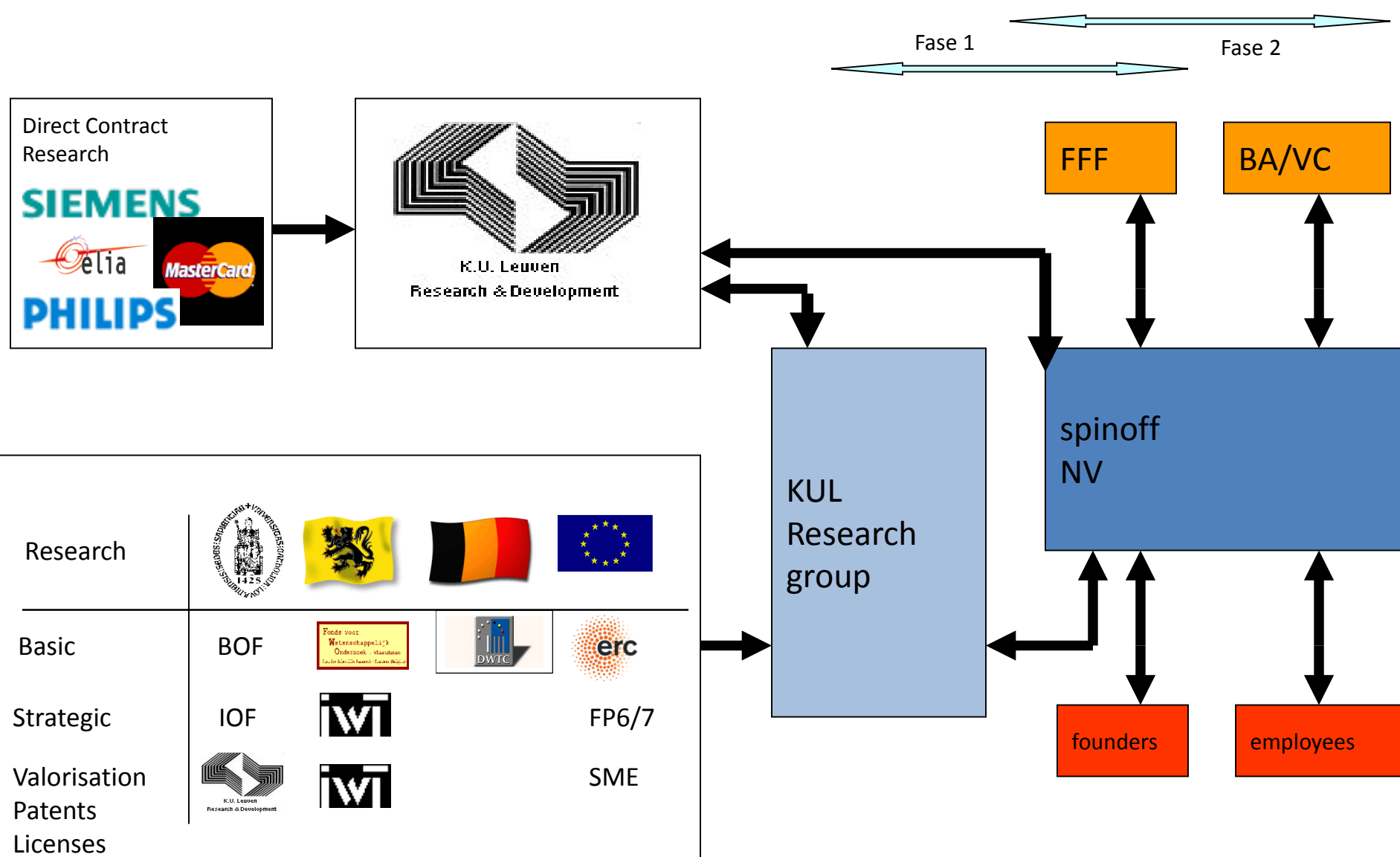
- 105 spin-off companies started, 87 still active; together +/- 4,100 employees (numbers 2014)
- 760 million euro external capital (2005-2014 only)
- 7 successful flotations (IPOs)

Multilevel interaction



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Direct Contract Research

K.U. Leuven
Research & Development

Research				
Basic	BOF			erc
Strategic	IOW			FP6/7
Valorisation				SME
Patents				
Licenses				

KUL
Research
group

FFF

BA/VC

spinoff
NV

founders

employees

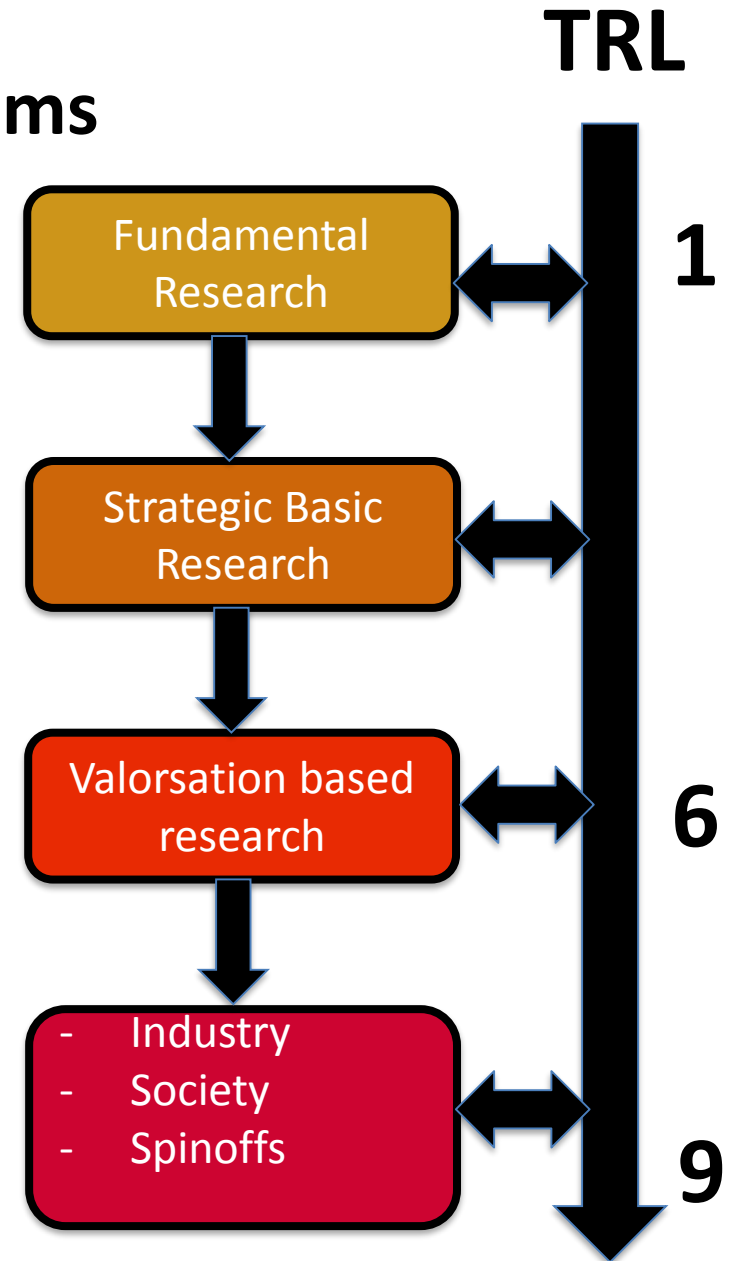
Stadius O&O matrix structure

- Horizontals: data driven **algorithms**

- Numerical (multi-)linear algebra
- System identification and control
- Digital signal processing
- Machine Learning
 - Support Vector Machines
 - Probabilistic algorithms
- Visualization

- Verticals

- Digital Health
- Industry 4.0
- Smart Cities
- Fintech



E-Health

Smart Cities

Industry 4.0

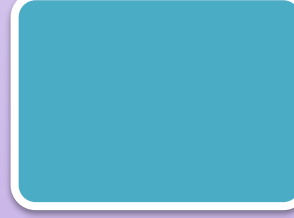
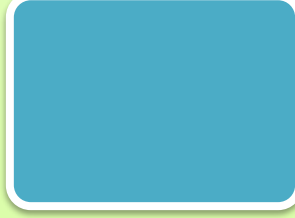
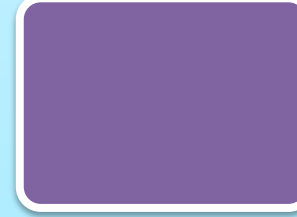
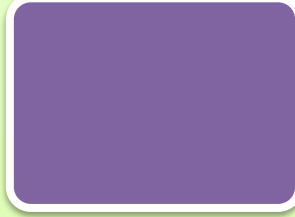
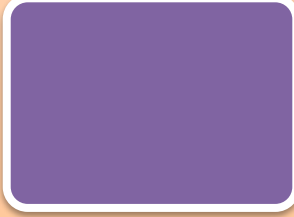
Digital Economy

Signal processing & systems

Data Mining - Exploration

Data Mining - Prediction

Data Mining - Visualisation



STADIUS - SPIN-OFFS "Going beyond research"

www.esat.kuleuven.be/stadius/spinoffs.php



www.tmleuven.be



**Data mining
industry solutions**

www.dsquare.be



**Data handling & mining for
clinical genetics**

www.cartagenia.com



Automated PCR analysis

www.ugentec.com



Financial compliance

www.baesystems.com



Automation & Optimization

www.ipcos.be



Specialized in modelling and control of multivariable industrial processes (chemical and power plants, oil exploration) automation & optimization (1995)

<http://www.ipcos.com/en>

employees:60

Value: 9 mio

Locations: Leuven, Eindhoven, Cambridge, India, Abu Dhabi

Lessons Learned:

- Endogeneous growth is slow
- Lucrative exclusivity deals hamper growth and business development
 - Shell
 - Co-development product
 - Opportunity and liability
 - Market, good deal
 - Potential for ultimate exit
 - Highly dependent on intransparent decision procedures
 - Years negotiation to kill exclusivity
- Learn from your large partners THEIR RoI is
 - Example batch reactor - 'earn back time'
 - Example chemical distillation – nonsaturated market
 - Academic: genericity is an asset
 - Commercially: genericity is a curse
- Large single investors
 - KBC → EU → MBO



Payment fraud detection (2000)

- 2004: acquired by Norkom Technologies ;
- 2011: Norkom Techn. acquired by Detica NetReveal , Bus. Division of BAE Systems Detica.

<http://www.deticanetreveal.com/en/about-us.html>

Lessons Learned:

- Originated in large EU project in mobile phone fraud detection
 - KPN, Orange, Proximus,...
- Taught us to understand Rol in fraud, churn, customer retention and recruiting efforts, ...
- Hence allowed us to determine our sales prices settings
- First experience with professional investors
- Corporate governance
 - External board members from industry
 - Liability for Col



Transport & Mobility

- Founded 2002
- Consulting and projects in traffic and mobility

<http://www.tmleuven.be/>

Employees: # 30

Turn over: 2.5 mio euro

Shares: 47 % KU Leuven,
53 % private

Lessons Learned:

- Example projects
 - Oosterweel
 - 'Rekeningrijden'
 -
- Services driven company
- No 'exponential' growth rate possible
- Restricted market
- Public Procurement Procedures
- Joint venture with TNO
 - Large Dutch 'government' company
 - Were clashing with 'Latin' culture in Belgium
 - Acquired 50 % of TML
 - Sold it again to original owners ('good deal !') because of internal reorganisation: Large companies reorganize !!



Data handling & mining for
clinical genetics (2008)

<http://www.cartagenia.com/>

- # Employees: 40
- Turnover: 4 mio USD
- Locations: Leuven – Boston
- Acquired by Agilent
- 7 mio / 60 mio

Lessons Learned:

- Company direct result from joint venture in research
 - STADIUS: bioinformatics
 - Center Human Genetics
- Founded by 2 of my PhD students
- CEO Herman Verrelst (current Biocartis)
 - Former Data4s → Norkom
 - Former Medicim → Nobel Biocare
- 3 -4 'serious' capitalization rounds
- Rol: Market clear (after zooming to niche)
 - Software for genomics prenatal tests in human genetics centers
- Sales partnership with Agilent
 - Flirting from the beginning
 - Exit !
- Board Chair
 - Paul Van Dun (director LRD, lawyer !)



TrendMiner
JOINT INNOVATION

- 2008
- Data mining software & services for process industry – alarm monitoring
- *won in 2009 the award of "best spin-off of the year"*
- # Employees: →60
- Turnover: 3-4 mio
- Locations: Hasselt, NY, Houston, Germany
- <https://www.trendminer.com>

Lessons Learned:

- 'Spin-in'
- Initiated: 2 engineers (former students of mine) from BAYER and 1 PhD
- Only 1 'survives'
- Co-development with large companies
 - Several SBO/O&O projects
 - E.g. Umicore
- Board Chair former CEO of BASF
- Several capitalization round
- Profesionalization of
 - Organization (CEO Bert Baeck)
 - Shareholders and Board (Jurgen Ingels, Ducko Sickinge,...)
- New trend: large companies want part of the shares for partnership/acquisition
 - Suez
 - Innovation Fund Chemie
- Internationalization !

- 2005
- In silico drug discovery
- *Activities ceased in 2012*

Lessons Learned:

- 'Spin-in'
- Initiated:
 - 2 pharmacologists J&J
 - 1 postdoc Stadius
- Co-development with large companies
 - Several SBO/O&O projects
- Excellent technology !
- But business model NOT ok !
 - Services to pharma
- 'Kiss of the spider woman'
 - Exclusivity
 - Non-disclosure
 - Non-scalable in partners/customizers
 - No leverage in follow-up trajectories of drug development
 - Scarce feedback (2nd opinion)

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Conclusies: Interactie met grote bedrijven

- **V**erbreed het perspectief en levert niche-/marktkennis op
 - Wat is de domeinspecifieke cultuur ?
 - Overstijg het 'generische': wat is belangrijk in HUN sector ?
 - Wie zijn HUN klanten ? Wat is HUN Rol ? (verkoop, prijszetting)
- **F**inanciering
 - Verkoop, prijszetting, vermarkting
 - Partnerschappen, pilootprojecten, co-ontwikkeling
 - Gezamenlijke subsidieproposals (VLAIO, EU,....)
 - Participaties en exit opportuniteit
- **H**uman resources
 - Recruitering
 - Board members (caveat: Col !)
 - Biotoop van markt