Public/Private Collaboration
{in,for,with}
Software Engineering

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CWI = fundamental research **applied** to societal challenges

- First computers; ARRA [1] applied to ocean modeling for dykes, etc.
- First programming languages; Algol, Python applied to everything
- First connected Europe to the internet; applied to … well everything :-)
- Primary attitude driven by long term vision, high impact potential for the future
- Balanced with skill and knowledge to apply now

[1] https://www.youtube.com/watch?v=ph7KyzFafC4
CWl research - organized

• Group x Theme matrix:
  
  • societal themes **reach out**: software, energy, logistics, information, life
  

• Collaborations
  
  • Networks: ERCIM, Informatics Europe, EIT ICT Labs, …
  
  • Business & Government: Banks & Insurance companies, Tax offices, High-tech companies, Services, etc, **local, national & international**
Driver 1 - Money

- CWI staff & support funded permanently; for stability
- PhD students and post-doc researchers funded per (four year) project; for flexibility
- Project funding = first collaborations, then personal grants
- Researcher careers = first personal grants, then collaborations
- High failure rate increases the number of submitted proposals

**For a senior researcher the amount of acquired funding is used as a key performance indicator**

**Opportunity to understand and manage personal grant projects, matching collaborative projects**

**Smaller directly funded project skips the overhead and risk of government project acquisition**
Driver 2 - Personality

- Ambition to have **impact**, to improve the world
- Vision to know where we should go
- Curiosity to find the truth and expose misinformation
- **Wanting to educate**, to send information
- Deep intrinsic motivation and enthusiasm
- Duty and responsibility for society

Ambition, morality and ethics are implicit drivers for researchers

Education is a key motivating factor in two-way collaboration
Driver 3 - Urgency

• Hard and urgent problems
  • Defending against the sea, safely and securely
  • Scheduling in a dense network (trains, ambulances, cars), optimally
  • *Understanding and controlling big software and big data, for economy, privacy and security*
  • Inventing more efficient ways of acquiring, distributing and using energy resources
  • Understanding processes related to terminal diseases
• Ad-hoc need for highly educated self-sufficient professionals
  • high-tech spin-off companies and start-ups
  • human resources in large companies
  • professors in universities

Can you help understanding, eliciting, the true urgency?

Can you help understanding, eliciting, the urgent human resources need?
Factor 1 - Network

- Researchers have a tight, dynamic but stable, and effective network
- Industry has a tight, dynamic but stable, and effective network
- Few and temporary, but effective, bridges between the two networks
- Are temporary “projects” the best form of organisation for public/private collaboration in research and development?

Opportunity for better and more match-making and match-sharing

Opportunity for managing long term relationships
Collaboration Factor 2: Software
Software is a **new medium** made possible by ICT.
Software is everywhere
Factor 2 - Software

• Software is a unique, weird and powerful *medium*
  • it drives product and service innovation; soon everything?
  • it is executable, transferable, evolvable knowledge + skill
  • it can be applied to itself!
• In software engineering research the same software is often:
  • both the research method and output to be published academically,
  • and the R&D prototype to be implemented in industry!
• CWI “SWAT” has decades of experience; skill, attitude & knowledge

Opportunity to scale up software as key transfer medium next to people & papers

More software prototypes as core research deliverable for projects

Make working software releases a research KPI