

IBM Strategy and Model of Engagement with Research Institutions



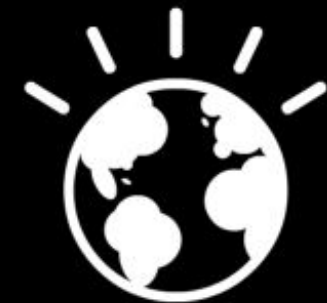
The IBM Academic Initiative

Our mission

- Partner with **academic** and **research institutions** to better educate students for a more competitive IT workforce & **support R&D** for a smarter planet

Our offerings

- No-charge access to IBM technology & tools (thousands of software titles)
- No-charge access to course materials and curriculum (hundreds of modules)
- Skills enhancement supported by a worldwide community of IBM volunteers
- Support **academic research**, partner in SUR projects, provide R&D infrastructure



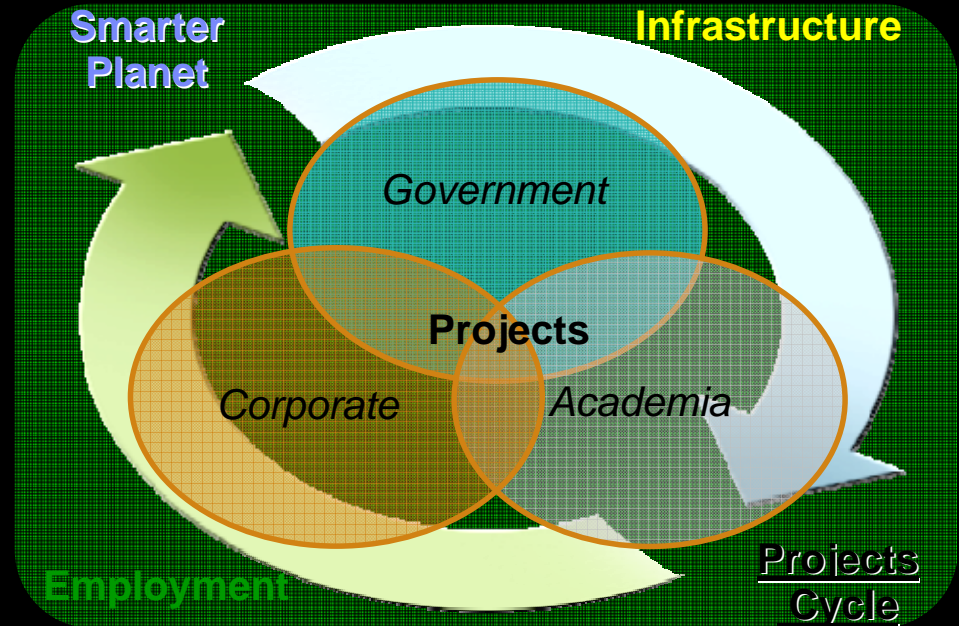
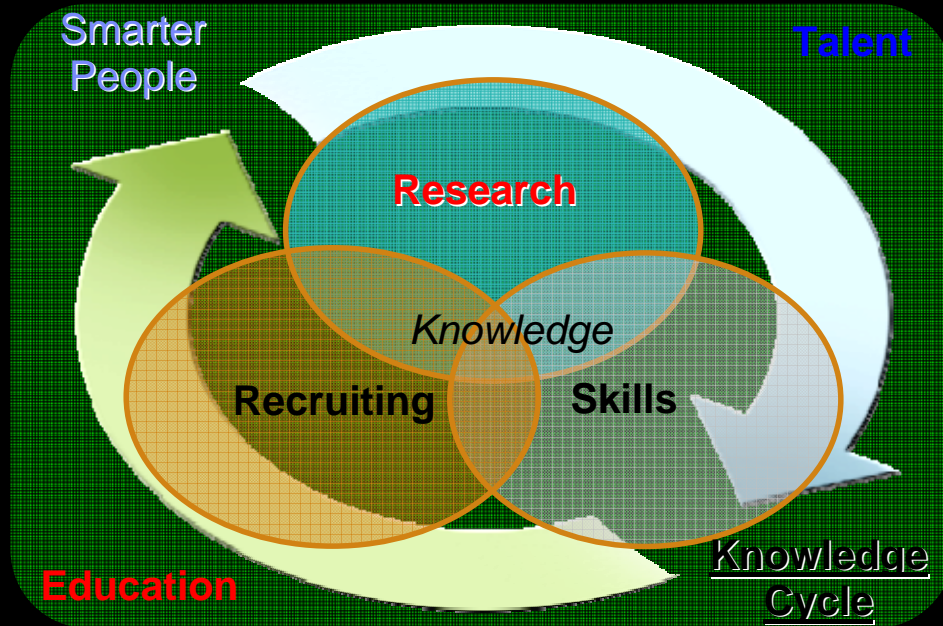
A SMARTER PLANET

WILL BE INSTRUMENTED, INTERCONNECTED, INTELLIGENT.
PEOPLE WANT IT. WE CAN DO IT.

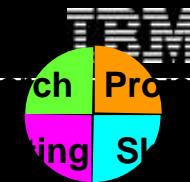
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IBM Global University Programs (GUP)

Relationships that Build Enduring Value for People & the Planet



- **Knowledge cycle** builds education system and **smarter people** (talent)
 - **Research** with faculty in academia and R&D centres to create new knowledge
 - **Skills** that grow global talent pool and expand opportunities
 - **Recruiting** students into a diverse global workforce
- **Projects cycle** builds employment system and a **smarter planet** (infrastructure)
 - **Projects** with *Government, Academia, and Corporate* change the world



Global University Programs - Today

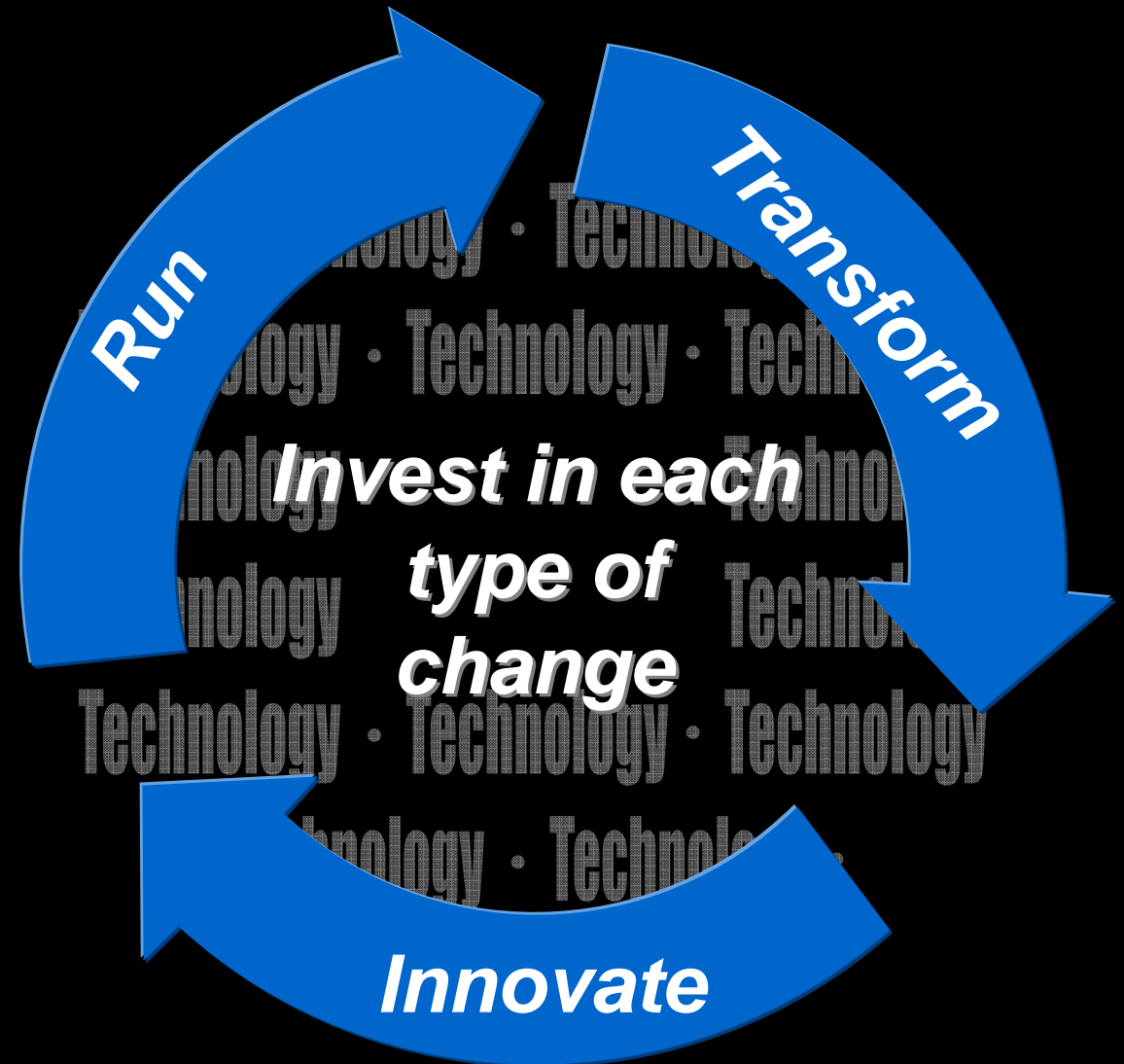
Focus Area	Programs & Initiatives
<p>Research <i>Collaboration in areas of mutual interest & value</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Shared University Research Awards (SUR) <input type="checkbox"/> Faculty Awards <input type="checkbox"/> Open Collaborative Research Awards (OCR) <input type="checkbox"/> Centers for Advanced Study (CAS) <input type="checkbox"/> World Community Grid
<p>Skills <i>Building the pipeline</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Academic Initiative Program <input type="checkbox"/> SSME/Smarter Planet Skills for 21st Century <input type="checkbox"/> LA Grid Initiative <input type="checkbox"/> Student Contests / Competitions (e.g. ACM, BLA) <input type="checkbox"/> Innovation Centers and Developer Relations <input type="checkbox"/> Volunteerism/Corp Citizenship
<p>Recruiting <i>Acquiring top talent</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> PhD Fellowship Program <input type="checkbox"/> Global Recruitment Campaign <input type="checkbox"/> Global University Sourcing <input type="checkbox"/> Extreme Blue Internship Program
<p>Projects <i>Value creation, sales, and revenue generation</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Partnership Executive Program (PEP) <input type="checkbox"/> Client Executives S&D <input type="checkbox"/> Public Private Partnership <input type="checkbox"/> Industry-Academic IP Collaboration

Invest to run-transform-innovate all systems

Entities (*complex systems*) adapt as value migrates into new areas of opportunity

- Three types of entities
 - Individuals
 - Enterprises
 - Businesses
 - Non-profits
 - Regional Entities
 - Universities
 - Cities
 - Nations

- Three types of change
 - **Run** = use existing capabilities that change with practice
 - **Transform** = adopt a new best practice
 - **Innovate** = create a new best practice



SP-Oriented Universities = D (Mode 1) + RC (Mode 2)

Disciplines (D): Mode 1

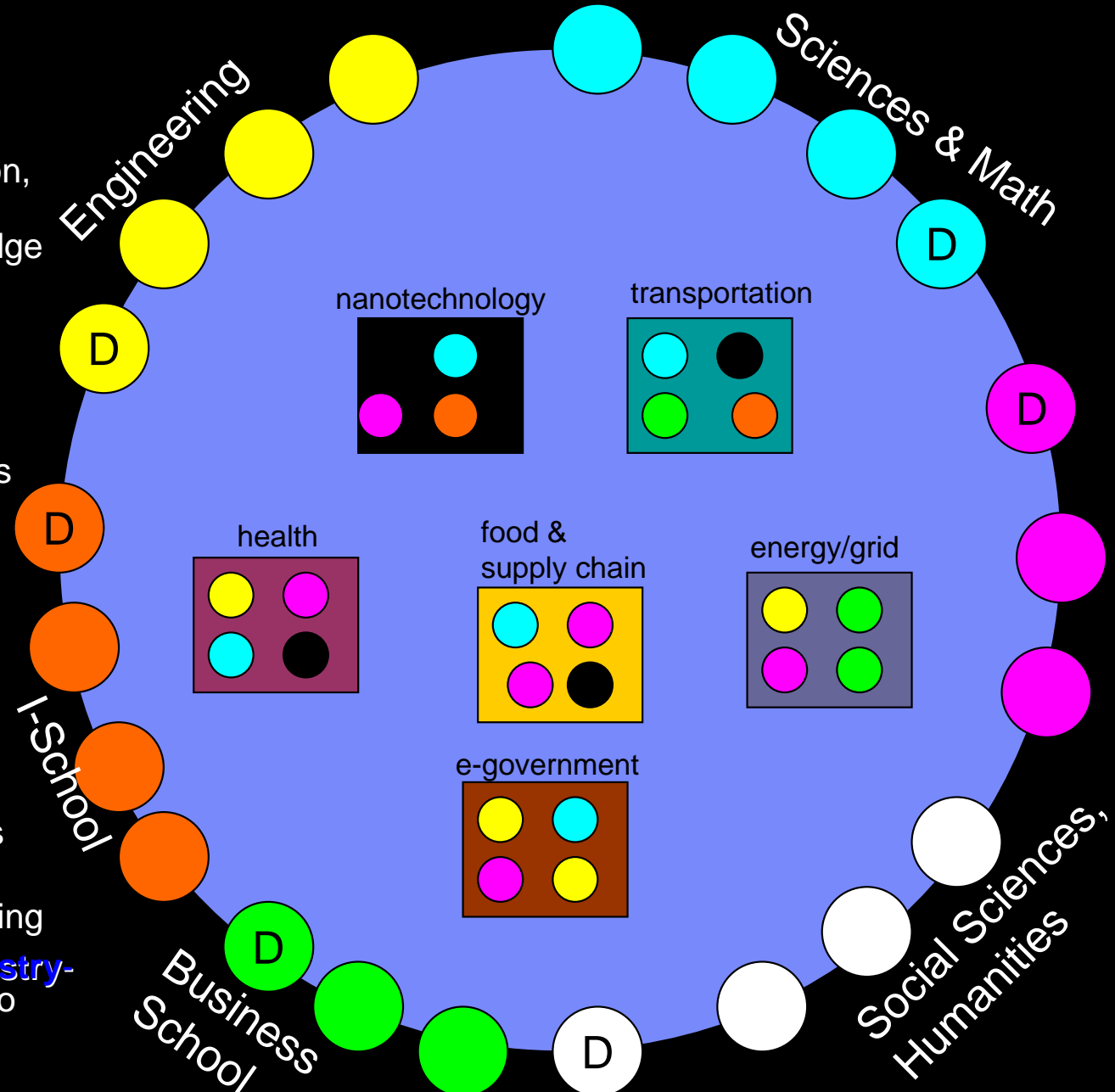
- Specialization (Codified Solutions)
- Cluster into schools of science, management, engineering, information, design, etc.
- Represented by circles around the edge

Research Centers (RC): Mode 2

- Integration (Real-World Challenges)
- focused on addressing real-world problems with multi-disciplinary teams
- Represented by squares containing circles inside

IBM Actions

- Identify the top research centers related to smarter planet themes
- Create research relationships with leading faculty/smarter planet experts in those research centers
- Enhance skills development & recruiting
- Increase triple-helix (**university-industry-government**) projects be increased to accelerate *run-transform-innovate* development of cities (metro-regions)



Universities are mini-Cities: System of Systems



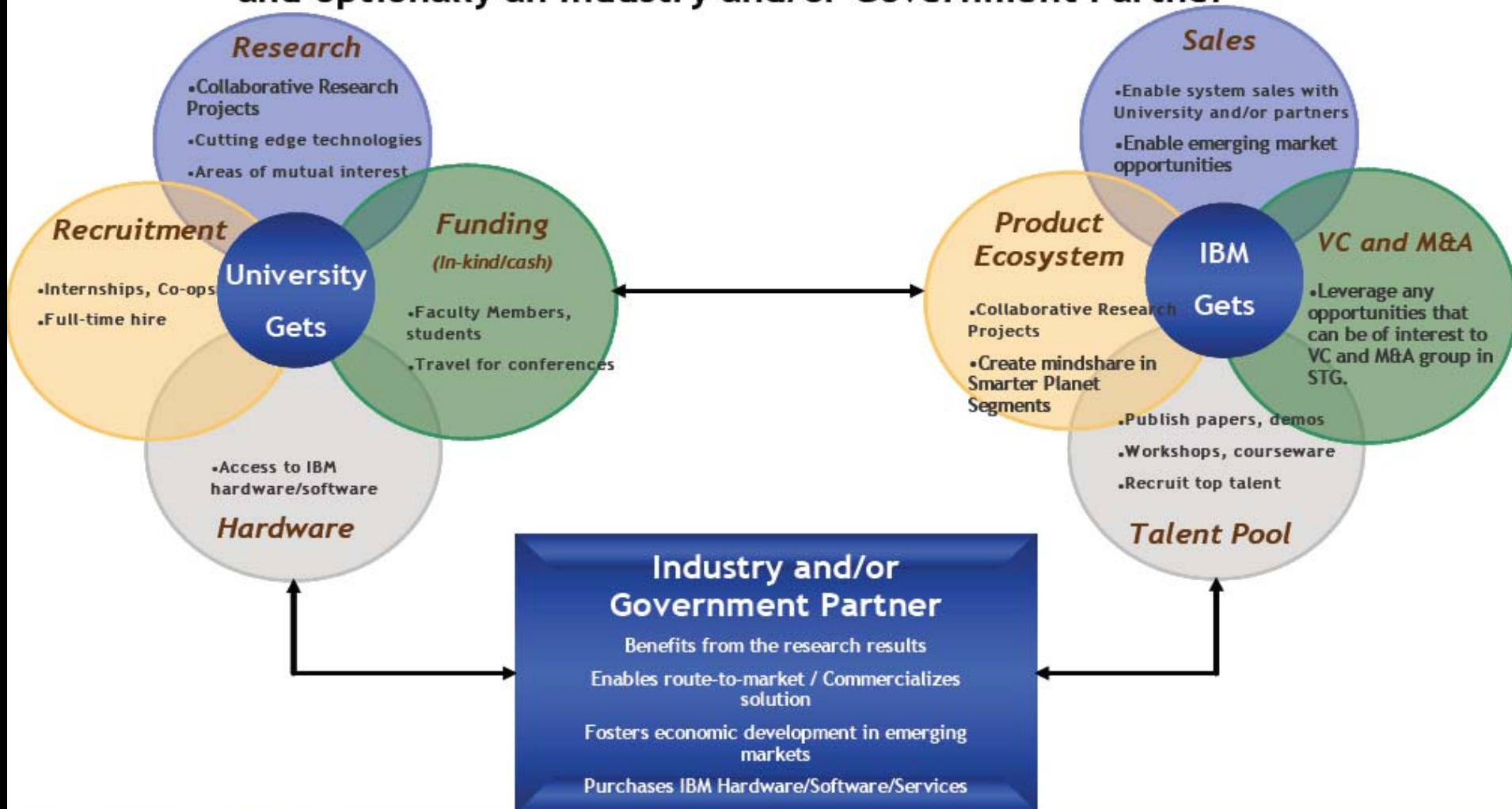
Co-Evolving Smarter Universities & Smarter Cities

SUR 2009 Initiative of Transilvania University

- **IBM SUR Project:** Smarter Buildings - Intelligent Distributed Workspace for Energy Efficiency in the GENIUS Campus (WEEGEN)
1. Developing a **global model of the building and office application space** of the distributed GENIUS Scientific Research Institute [PRODD], based on quality indicators:
 - Reflecting activity types and specific, operational conditions for equipment, work conditions for personnel, economic factors)
 - At office, laboratory, building and campus level (distributed, networked, hierarchical)
 - Accounting on environmental conditions (**external:** light, temperature, humidity, **internal:** light, heating, ventilation, noise)
 - Considering power consumptions, energy costs per energy source, period of the year, day/night, efficiency indicators
 - Reflecting activities, security rules, constraints, imposed conditions, people preferences
 2. The design of a **distributed data acquisition and control architecture** based on wireless sensor, actuator and computing networks to provide high energy efficiency:
 - At building level;
 - At data centre level;
 - At GENIUS campus level
 3. Development of the solution for **automatic switching to the most efficient energy source** based on the real-time status of the space model, energy costs and preferences
 4. Curricula design and implementing the **new Master program "Intelligent Systems for a Smarter Working and Living Infrastructure"**

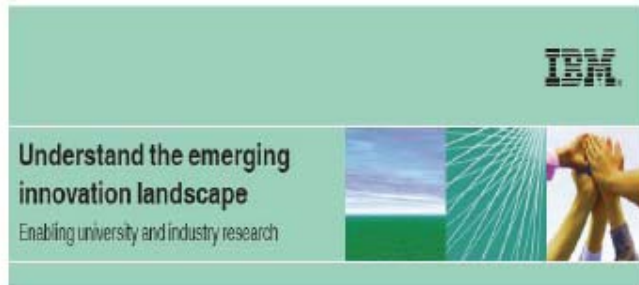
IBM STG University Alliance Global Model of Engagement

A win-win alliance between a University/Research Institution, IBM, and optionally an Industry and/or Government Partner



Global University Programs

Academic Initiative



Provide professors and students access to a wide range of IBM SW and curricula via direct download and via the IBM Cloud

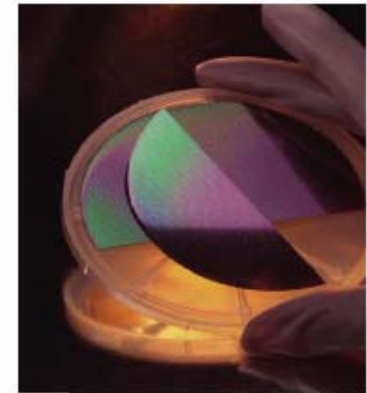
PhD Fellowships



Honor...and recruit exceptional Ph.D. students in disciplines of mutual interest fundamental to innovation

Shared University Research (SUR)

Strengthen IBM's technical presence at leading research universities and relationships with top researchers in the worldwide university community



IBM Cloud Academy

An ecosystem of leaders in designing and building cloud computing capabilities for students, institutions, and technology providers

Faculty Awards



- Foster collaboration between researchers at leading universities and IBM research, development and services organizations*
- Promote curriculum development to stimulate growth in strategic disciplines and geographies*

Key research areas for IBM in 2010

- Smarter Businesses & Society
- Smarter/Dynamic Infrastructure
- Core Technologies

Smarter Businesses & Society

Services and software to improve business performance:

- Intelligence & Analytics: instrumentation, cyber-physical systems, analysis and modeling of complex systems, financial transparency and regulation compliance, optimization, risk & integrity
- Organizational Transformation & Service innovation: green and service supply chains, energy and environment monitoring/modeling/management, mobile delivered services, organization architecture and service design, service quality, Web 2.0 & social networks, virtual world/3D internet
- Information management & analysis: real-time/ real-world awareness, spatial-temporal data analysis, digital video surveillance & security technologies, information based medicine/ healthcare management, intelligent transportation systems

Smarter/Dynamic Infrastructure

Hardware, software and services dynamically integrated into an open and secure computing environment

- Deep computing: Blue Gene
- Technology infrastructure: green systems/data centers, converged networks (10GbE, Converged Enhanced Ethernet (CEE) & Fibre Channel over Ethernet (FCoE)), intelligent embedded systems, event driven computing, middleware as a service (i.e. Service-Oriented Architecture-SOA), system complexity and security, workload optimized systems
- Virtualization: hybrid multi-core systems, cloud computing, ensembles, internet data-centers

Core Technologies

- Computing technologies: multi-core processors, power management, nanotechnology & nanostructures, 3D-systems and integration, SSD & flash memory, NVRAM/eDRAM memory technologies, micro-electronics, optics, low overdrive logic, computational lithography
- Energy technologies: batteries, renewables, solar including photovoltaics, storage

Academic Initiative in University Relations 2009



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▪ IBM UR in Research

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- *IBM ww Research Programs* awarded, recipients:
 - IBM Faculty Awards cycle 1/2009: “Integrated Cooperation Space for Competitiveness and Innovation in SME (IN@SPACE)”, Dorin Carstoiu (PUB)
 - IBM Shared University Research cycle 1/2009: “Smarter Buildings: Intelligent Distributed Workspace for Energy Efficiency in the GENIUS Campus”, Sorin Moraru (Transilvania University of Brasov)
 - IBM Open Collaboration Research 2009: “CEEMEA Blue Gene Research Collaboration and Community Building”, 2 Romanian universities in a 5-university consortium: Dana Petcu (West University of Timisoara) & Emil Slusanschi (PUB)
- *FP7 projects coordinated by IBM*: “Integrated Water Technology IN.WA.TE.R”, IBM Haifa coordinator, PUB participant (Radu Dobrescu)
- *IBM PhD Fellowship*:
 - 2009/2010 cycle: “Data Storage, Representation and Interpretation in Grid Monitoring Environments”, PhD student Alexandru Costan (PUB)
 - 2010/2011 cycle: “Applying Emergence and Self -Organization to Engineer High Quality Autonomic Systems”, PhD student Bogdan Caprarescu (WestUTimisoara)
- *IBM John von Backus 2009 ww Award*: Radu Marinescu, CS Dept. PolitehnicaUTimisoara

University Relations Plans for 2010

1. Skills:

- Extending the number of *IBM courses / SW technologies* in undergraduate and master programs. Validate by student qualifications and student/professors certifications
- *WS, trainings, conferences:* (i) on BPM, Jazz & Rational Team Concert, WebSphere sMash, Application Server and Lotus Mashups; (ii) on demand

2. Service Science (skills and R&D):

- (1) Support creation of a national R&D program in the Science of Services [ANCS]
- (2) Support recently launched Master program 2009/2010 “Service Engineering and Management” and promote in country universities
- (3) Support strategic program INSEED: Fostering innovation in services through open, continuous education” (PUB, TUBv, AES, Carol Davila UMF)

3. Collaborative Research:

- (1) Support creation of **HPC/BG** dynamic infrastructure & skilled team for strategic research
- (2) Advise objectives and activity plans for major **HPC-based research** lines: Health Care, Life Sciences, **Nanotechnologies**, Water Management (urban, river network, Danube and Black Sea + weather)
- (3) Support development of **Cloud Computing** infrastructure (education & research)



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SP: Something meaningful is happening...

*“Every human being, company, organization, city, nation, natural system and man-made system is becoming **interconnected, instrumented and intelligent.** This is leading to new savings and efficiency—but perhaps as important, new possibilities for progress.”*

The world is flatter.

The world is smaller.

The world is getting smarter.



Because it can.

Because it must.

Because we want it to.



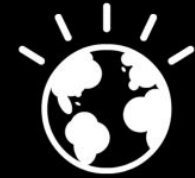
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smarter planet

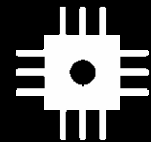
Smarter is a **vision** of how the world works — *how every person, business, organization, government, natural system, and man-made system interacts.*

- Each interaction represents a chance to do something **better**, more efficiently, more productively.
- But more than that, as the systems of the planet become smart, we have a chance to open up meaningful new **possibilities** for progress.

smarter planet



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Our world is becoming

INSTRUMENTED



Our world is becoming

INTERCONNECTED



Virtually all things, processes and ways
of working are becoming

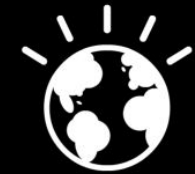
INTELLIGENT

IBM's Vision for the Smarter Planet

- The instrumented, interconnected, and intelligent world can be measured, and then *IT can be applied* to allow proactive, not reactive decisions.
- A holistic approach to the Smarter Planet integrates all technical and business disciplines to *analyze and utilize information in new ways*.
- Despite, or rather because of, economic conditions, greater efficiency and an innovative approach are a compelling *business model*.
- It will take a coordinated effort among *policy makers, enterprises and consumers* to make these systems smarter.



What do we mean by “smarter planet”?



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New Intelligence: Flexibly and efficiently linking complex data together using context-sensitive, adaptive information seeking tools.



Smart Work: Adapting legacy solutions into formal business operation models to increase productivity and rapidly respond to changes in business processes.

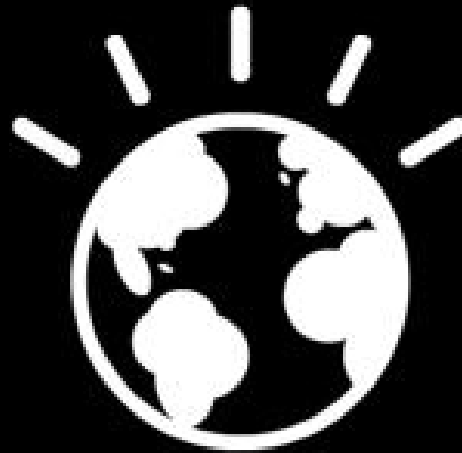


Green and Beyond: Optimizing data center infrastructures for energy and space efficiency using advanced metrology techniques and physics-based modeling.



Dynamic Infrastructure: Delivering complex enterprise class applications to end users efficiently and effectively via the network.

Let's build a smarter planet



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