



# Bio-Modeling Systems

*The R&D booster for life sciences discoveries*  
*A leading Integrative Systems Biology Company*

## *Summary Presentation*

*The full presentation is available on [www.bmsystems.net](http://www.bmsystems.net)*

### Bio-Modeling Systems SAS

Dr. François Iris (PhD), Chairman & CSO  
Manuel Gea, Chief Executive Officer  
Paul-Henri Lampe CIO Integration Systems Director  
Dr. Gérard Dine (MD, PhD), Chief Medical Officer

### To contact us

Bio-Modeling Systems SAS  
26, rue Saint Lambert  
75015 PARIS, FRANCE  
e-mail: [manuel.gea@bmsystems.net](mailto:manuel.gea@bmsystems.net)  
web site: [www.bmsystems.net](http://www.bmsystems.net)

# BMSystems' Mission

BMSystems is a research-based biotech company that creates CADI\*™ models to boost its clients/partners R&D programs with immediate applications generating highly attractive businesses

## *BMSystems research/business model:*

Ø BMSystems generates *innovative hypotheses* to create new knowledge from raw information through the construction of CADI™ models and,

Ø BMSystems generates *real & attractive business* from this new knowledge through its innovative business model.

*\*Computer Assisted Deductive Integration*

# BMSystems CADI™ models

The CADI™ models are detailed maps of inter-cellular and/or intra-cellular mechanisms associated with a biological status.

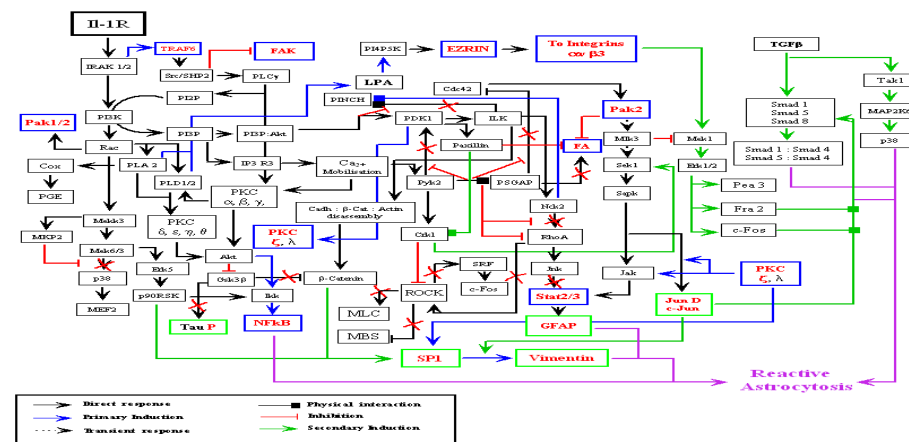
ØCADI™ models are outstanding “non-mathematical” descriptive in-silico answers to explain the non-linear mechanisms of life and diseases.

ØCADI™ models can describe the dynamics of pathological processes and/or pathological mechanisms vs. control.

ØCADI™ models describe the mechanisms that cause the diseases, not only the consequences.

ØCADI™ models create the optimum new knowledge required to identify/explain mechanisms that can lead to direct industrial applications.

ØCADI™ models have repeatedly led to novel patentable discoveries in highly competitive applications.



# BMSystems profile

## *Corporate Profile:*

- Bio-Modeling Systems or BMSystems S.A.S.
- Date of incorporation: 2004, registered in Paris.
- “Young innovative Company” status since creation.
- BMSystems is an Independent Private Company,
- BMSystems is *100% owned by its founders* (no search for external investors).
- BMSystems is member of *BiO* (USA)
- BMSystems is member of *the R&D committee* of Medicen life science world cluster.
- BMSystems controls 40% of its operational and funded spin-off: *Pherecydes-Pharma*.

## *Company specificities:*

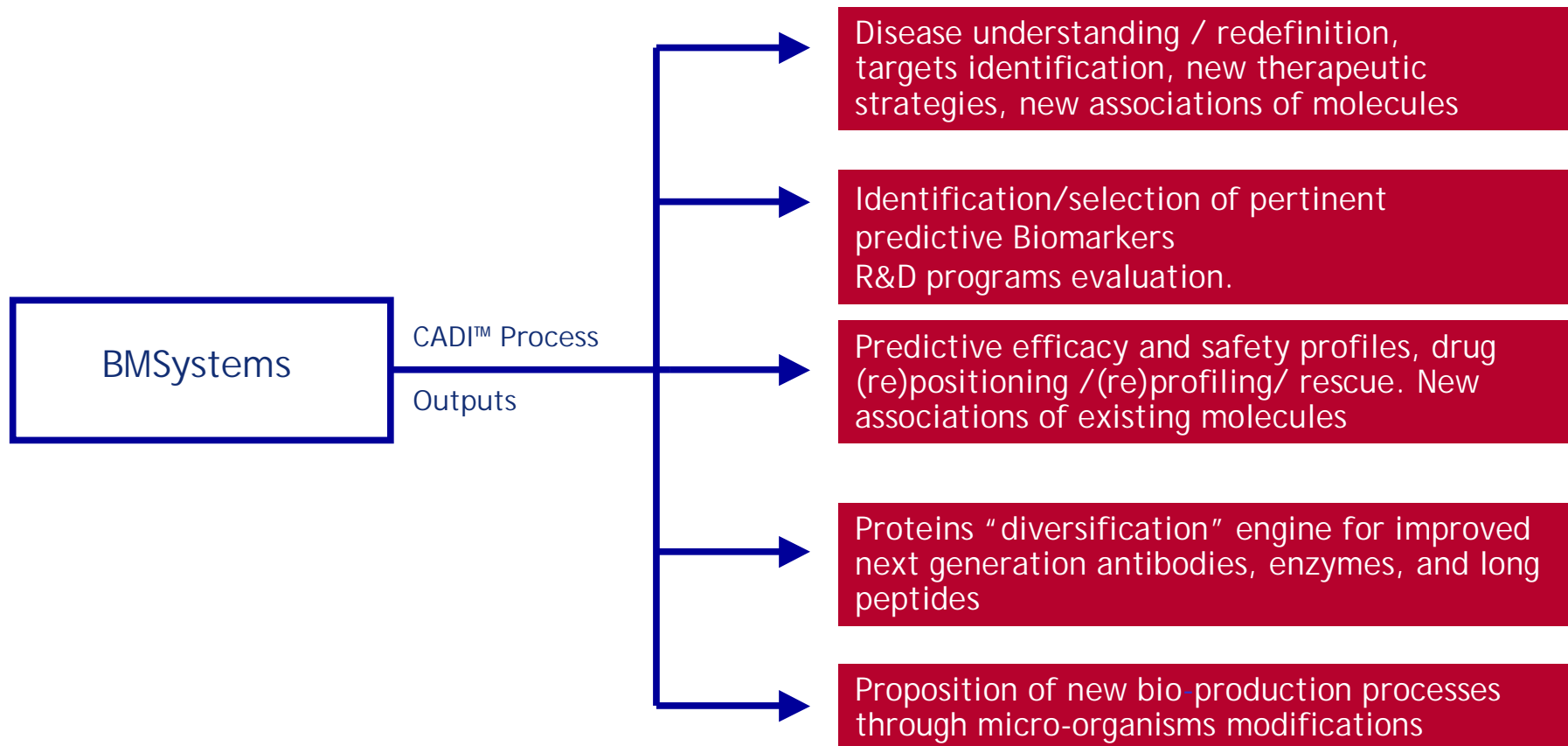
- BMSystems is a *“biology” driven company* that intensively uses I.T. resources.
- The company policy is to externalize all non-strategic functions and know-how.
- Number of FTE\*: 9 scientists/professionals
- More than *100 professionals are* working on BMSystems’ related programs.
- CADI™, based on the *“negative selection process”*, was invented by Dr. François Iris (founder & CSO).
- The company’s proprietary technologies and methodologies *are industrial secrets*.
- BMSystems uses its CADI™ tools for its own research programs.

\*Full Time Equivalent

# BMSystems outputs

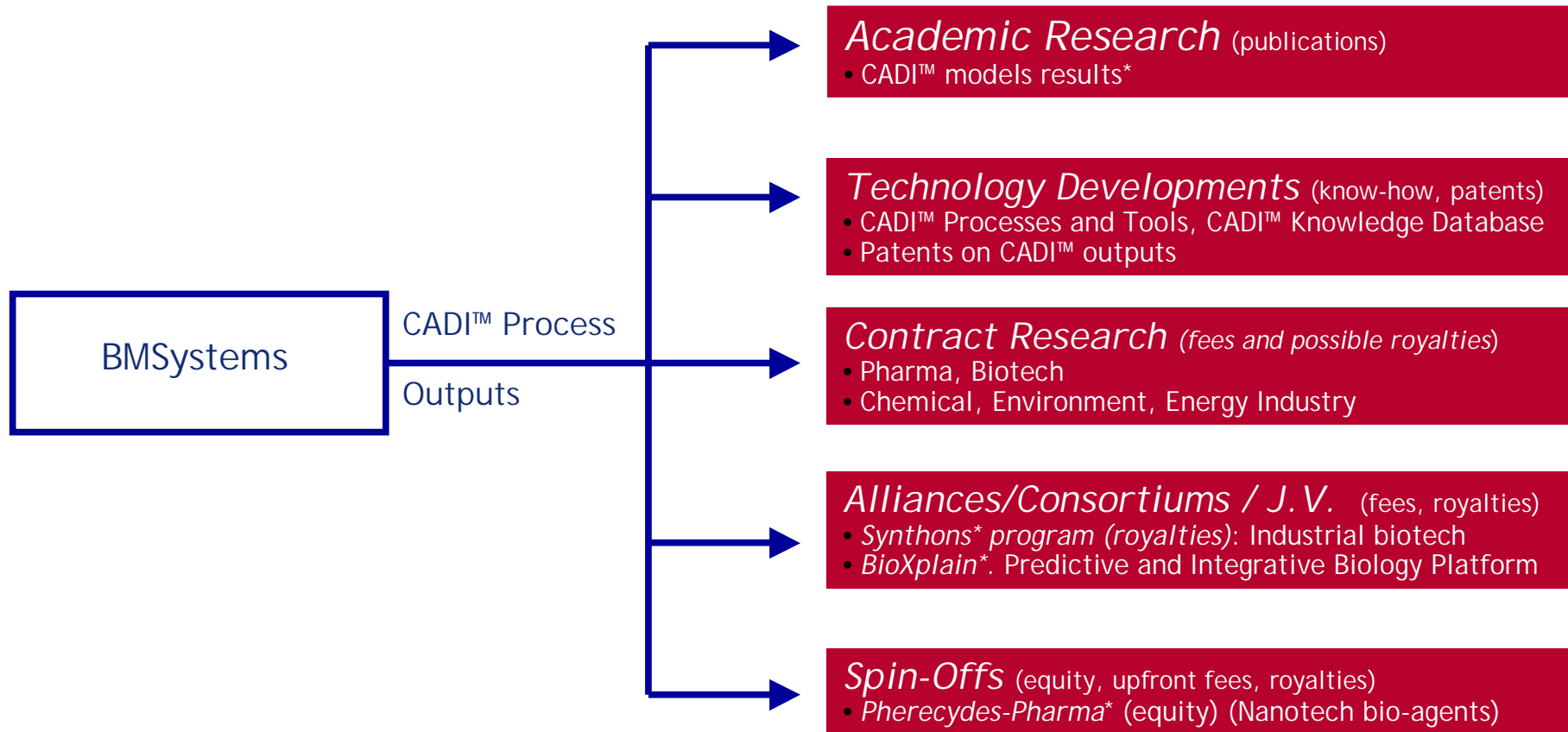
*What can we do with CADI™ models?*

*Reduce time to result, improve success rate and reduce development costs in the following markets, **biomedical, chemistry, environment, energy**, through:*



# BMSystems business model

*What kind of "Value" can we generate?*



\* See the details in the four case studies document



# BMSystems programs development

*Only non-contractual CADI™ programs extract*

Program Name	Validation / Business Partner(s)	Feasibility study	CADI™ version 0	CADI™ Validation	Patents / Publication	Lab Proof of concept	Industrial Proof of concept	Ready for Business
Nano-Bio-agents	Pherecydes							
Protein "improvement"	Pherecydes							
Chronic Fatigue Syndrome								
Ebola virus ecology								
Hepatitis C								
CNS-Psychiatry	CEA Life Sciences							
CNS-Neurodegenerative	CEA Life Sciences							
Fibromyalgia								
Pain								
Migraine								
Multiple Sclerosis								
Psychiatric disorders								
Program Synthons	ARD-IBT-Rhodia							
Program Synthons	ARD-IBT-L'Oréal							
Program Synthons	ARD-IBT-Arkema							
Breast cancer-Hras	INSERM							
Tamoxifen resistance	INSERM							
Metastasis mechanism	INSERM							
Müllerian regression	CNRS DATA							
Adipocytes growth control								
Hypercholestermia								
Metabolic Syndrome								

Infection-Immunology	Oncology
CNS-PNS	Tissue Differentiation
Industrial biotech	Metabolism

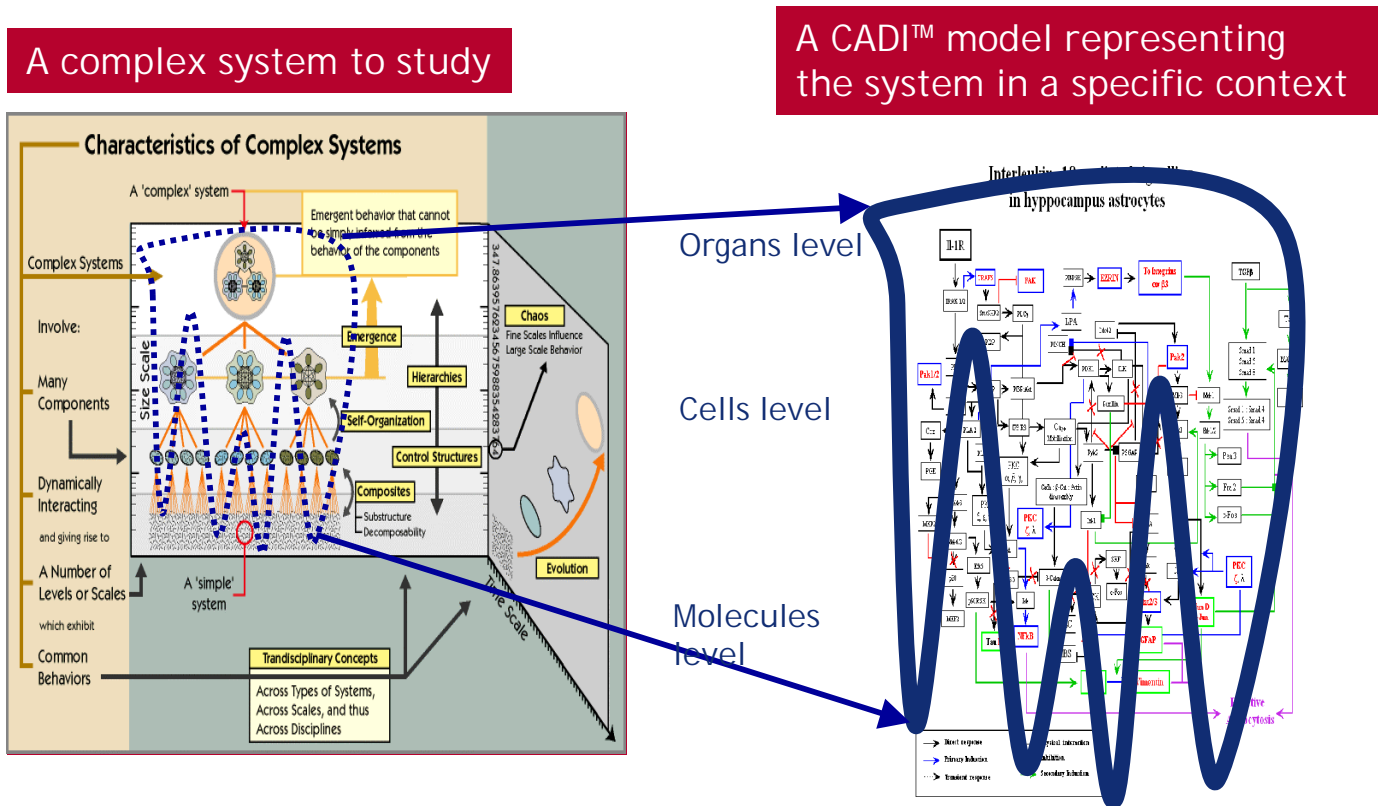
# CADI™ Concept Genesis

*CADI™ invention: The result of a continuous conceptual & technological innovation process started in the 90s.*

- 1989 -1993 Dr. Iris is Group Leader at the CEPH in Paris a Research Institute founded and lead by Nobel laureate Prof. Jean Dausset. He identifies *the lack of appropriate methodologies and tools* to analyze data produced.
- 1993 -1996 Dr. Iris creates & leads Millennium Pharmaceuticals' (USA) HT Sequencing Unit. *He invents & develops basic tools and methods* required for Integrative Biology.
- 1996-2001 - Dr. Iris is co-founder and C.S.O. of ValiGen SA in Paris
  - He invents and develops the computerized data gathering, data mining, clustering and integration tools & technologies with Lion BioScience *through a major European "Eureka" program granted 18.6 M Euros.*
  - He finalizes the Bio-Graph™ analytical platform based on the "Cartesian positive selection" concept and is one of the first to *identify and understand the limitations* of this kind of platform if used alone.
- 1999-2001 - Following his understanding of the Eureka program failure, *Dr. Iris decides to abandon the Bio-Graph™ type platforms* and starts working on a new Generation of analytical platform (CADI™) based on the "negative selection" concept.
- 2002-2003 - Dr. Iris with M. Gea, P-H Lampe, P. Santamaria and Dr. Dine *initiate the BMSystems project* and develop CADI™ tools and methodologies.
- 2004 - *The company is created and signs its first business deal with a Pharma.*

# The 5 CADI™ principles

1. An *“Architectural Principles”* Approach.
2. Our *“Negative Selection”* Process.
3. Our *“4 steps validation”* Process.
4. Our *“Broad life sciences & IT”* Expertise.
5. Our *“synergic collaboration”* with classical IT partners.



# BMSystems' Business Description

## *Our Business Proposal specificities*

### *CADI™ outputs for a specific research program:*

- *The CADI™ presentation and maps:* The interactions maps describe *the contextualized inter and intra cellular relations within & between pathways.*
- *The CADI™ report:* The report (management summary and full report) explains and supports the CADI™ interactions maps.
- The CADI™ outputs are available for protection/patent filing by the client during a negotiated exclusivity period of time.

### *BMSystems does not sell:*

- Its CADI™ technologies and methodologies (All the means to achieve the CADI™ outputs).
- The access to its CADI™ technologies and methodologies.
- Its CADI™ knowledge Databases and its proprietary pathways.

### *CADI™ Proprietary Technologies and Know-how:*

- CADI™ Search (data acquisition & mining);
- CADI™ Framework (data organisation & structuring);
- CADI™ Fiber-N (integrative engine);
- CADI View (model representation & visualisation).
- CADI™ knowledge Database;
- BioXplain, the First Open Platform for Iterative, Predictive and Integrative Biology

# Our Business deals structure

## *The three key Phases of CADI™ programs:*

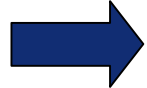
- *Feasibility Phase:* Feasibility study if necessary to define possible success chances of proposed programs (clients, partners or internal to BMSystems).
- *CADI™ Phase I:* Construction of the CADI™ model version “0” with non-confidential information and proprietary CADI™ Knowledge database information.
- *CADI™ Phase II:* Independent Experts and Experimental 4 steps validation process of the CADI™ model forecasts. The Phase II is the *indispensable collaborative phase* to secure and maximize industrial exploitation of the CADI™ model. The CADI™ outputs are available for protection/patent filing by the client during a negotiated exclusivity period of time.

## *Attractiveness of our business deals for our clients:*

- Very low client's human resources investment *but with a necessary strong motivation and involvement of its people.*
- *A unique opportunity to train client's team members* to integrative biology
- No necessary large scale technology transfer.
- *No large upfront investments* compared to classical systems biology programs.
- During the research program phases, the client benefits of BMSystems exclusivity.
- *Very flexible deal structures.* *One shot or “post program exclusivity”,* but the decision must be taken before the launch of the Phase I Program. The additional costs are a percentage of total phase costs, and recurrent cost per year for post program exclusivity period.
- To confirm the “*post program exclusivity*”, the Phase II program must have been launched.
- Possible/recommended after sale follow-up program.
- Finally, *the creation of significant value through savings of time and money*

# BMSystems' efficacy

## *The Proof through operational achievements*



*New therapeutic strategy:* Publication, in 2003, with the INSERM unit 553, of the first independently validated in-silico model of a complex human disease.



*Spin-Off:* 3 patented new disruptive technologies & successful launch and financing of Pherecydes-Pharma, the first bio-defence and bio-security company in France to efficiently & reliably address first bacterial threats, next viruses, and then toxin threats.



*Consortium:* Co-founder in 2006, as *integrative biology partner*, with its key partners A.R.D. , I.B.T. and C.V.G., of the Synthons platform, the major integrated collaborative industrial biotech platform in France,



*Industry Award & patent :* This collaborative work received a Bio-IT World 2009 Best Practice Award. A second CADI™ modeling program with the same CEA-SEPIA\* research team also allowed the discovery of novel therapeutic approaches in the treatment of poorly served CNS diseases (patent pending).

\*CEA-SEPIA: Atomic Energy Council: Department of prion and atypical infections research



# Let's go a step beyond

The pharmaceutical industry now requires its *scientists and clinicians* to harness & explain the non-linear mechanisms of health and diseases.

But they need *adapted systems and tools to help them work*.

Three complementary, cutting edge life sciences companies decided to collaborate to address this challenge:

*ØBio-Modeling Systems*: The inventor of CADI™ methodologies and tools, including the collaborative iterative validation process.

*ØBioXpr*: The most diversified provider of Software solutions built from a versatile library of modules to create real-added value from "OMICS" datasets.

*ØKayentis*: The provider of the first "Digital Pen and Paper technology 2.0", the universal platform delivering "contextualized" information .






The first Open Platform for Iterative Predictive and Integrative Biology.

*Now we can Bio-eXplain!*



# BioXplain founders

*Three founders sharing same values and history*

Company	Company specificities	Company information
	<ul style="list-style-type: none"> <li>• Created by senior scientists and engineers.</li> <li>• Inventor of CADI™ methodologies and tools</li> <li>• Research-based biotech company</li> <li>• <i>The company does not sell its technologies nor access to its technologies</i></li> <li>• 1 spin-off Pherecydes-Pharma</li> </ul>	<ul style="list-style-type: none"> <li>• The R&amp;D booster for life sciences discoveries, Member of BiO</li> <li>• Established : 2004</li> <li>• 9 FTE based in France, 100 people working on BMSystems research programs</li> <li>• Active in the pharma, Industrial biotech and biosecurity businesses</li> </ul>
	<ul style="list-style-type: none"> <li>• Created by senior scientists and biologists.</li> <li>• Collect, format, store, integrate, analyze and interpret from literature and experimental data ("OMICS", "environmental" data ,...)</li> <li>• Technology based on a library of powerful software modules that can be easily combined to create specific custom tools.</li> </ul>	<ul style="list-style-type: none"> <li>• A State of the Arts software solutions company.</li> <li>• Established 2003.</li> <li>• 10 people based in Namur Belgium.</li> <li>• Namur University Spin-off.</li> <li>• Numerous clients in the pharma, red and green biotech industries.</li> </ul>
	<ul style="list-style-type: none"> <li>• Created by senior scientists and clinicians</li> <li>• Collect, carry and share research, pre-clinical, clinical and post-marketing data using Digital Pen and Paper technology, DPP.</li> <li>• Full, un-biased and complete data capture in real-time ensure the completeness and integrity of the data.</li> </ul>	<ul style="list-style-type: none"> <li>• A software provider with strong growth</li> <li>• Established in 2004.</li> <li>• 40 staff based in France (Gif-sur-Yvette, Grenoble, Reims) and in the United States (Philadelphia).</li> <li>• More than 10 000 users in 44 countries on 5 continents.</li> </ul>



# Clients & Partners of BioXplain founders

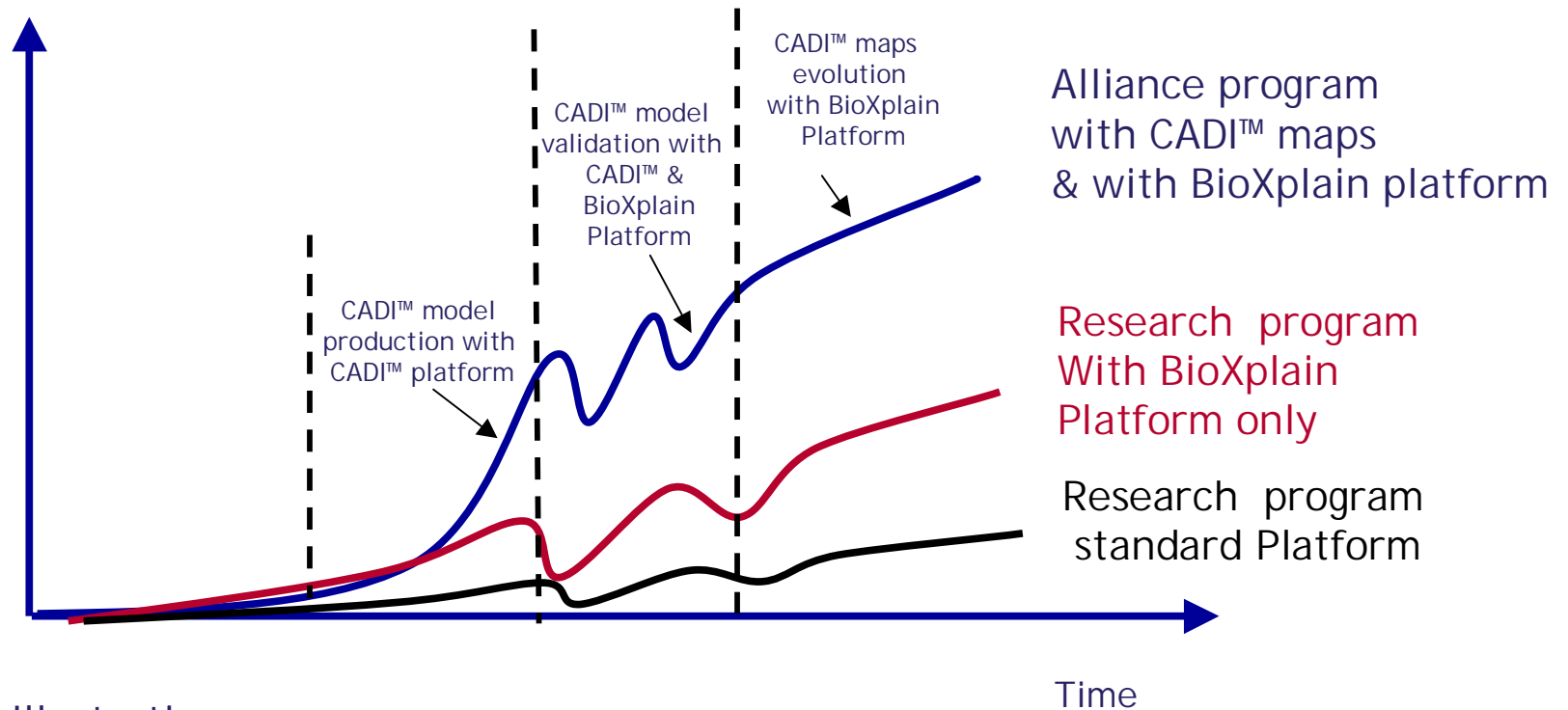
*Diversified complementary network*



# Comparative R&D Program value generation

*BMSystems: a leading Integrative Systems Biology Company*

New validated knowledge



Illustrative

[www.bmsystems.net](http://www.bmsystems.net) ; [manuel.gea@bmsystems.net](mailto:manuel.gea@bmsystems.net)