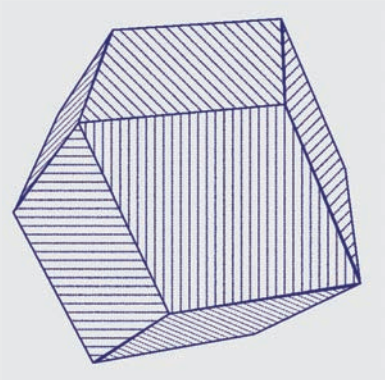
CALL FOR PLAYERS • MAY 2010



CALL FOR PLAYERS

ILABS PROJECT

THE INDEFINITE EXTENSION OF HUMAN LIFE-SPAN

ILABS BACKGROUND

iLabs – a multidisciplinary private research institute based in Milan – were founded in 1977 by Antonella Canonico and Gabriele Rossi.

Our researchers thoroughly investigate any issue in science, philosophy and technology related to the extension of human life-span: mathematicians, physicists, chemists, IA experts, biologists, physiologists, geneticists, psychologists, philosophers, linguists, jurists, economists and several institutes worked with us in the past – and many work today.

The *iLabs project* is entirely self-funded: *iLabs* entrepreneurial activities, based on R&D results, guarantee the independence needed to do cutting-edge research. After *Semi-Immortality* - the volume that explains the vision and the "big picture" behind 30 years of research - *iLabs* researchers published two other books, *The Mind Does not Lie* - an introduction to psychoneurophysiology - and *The Mathematics of Models of Reference,* containing the complete axiomatization of the principles of the MoR theory.

The publishing of *The Law in the Society of Semi-Immortality* - an essay in moral philosophy, justice and social theory - and the English version of the *Mathematics* (*College Publications*, London) are scheduled for the second semester of the year.

Contacts

iLabs srl
via pattari, 6
20122 - Milan, Italy

phone: +39 0245476305
fax: +39 0272004495

Skype: iLabs_Milano
e-mail: info@ilabs.it
www.ilabs.it

ILABS PROJECT • CALL FOR PLAYERS

Defeating death and postponing aging are dreams of mankind since the dawn of civilization. But it is just now that, for the first time in human history, we can talk about immortality on scientific grounds: 2000 years ago a Roman could expect to live for about 28 years, while life expectancy at the beginning of Twentieth century was 50 years for people in Western Europe. An average Italian born in 1990 is likely to live for about 80 years. If the technologic and scientific development will continue this exponential growth, it is not impossible that someone among the readers of this document will live for hundreds of years.

Medicine and biology, mathematics and physics, philosophy and social sciences have developed in the last century many powerful theories that may be used to aid the extension of human life-span. The completion of Genome Project, inventions by computer scientists, the diffusion of wealth, new diagnostic and clinical approaches to deadly diseases, are just few among the fundamental intermediate steps already accomplished by humanity as a whole.

In the last decades we have been accumulating countless experimental evidences on aging: nevertheless, the lack of a common vision and shared long-term aims had weakened the impact of groundbreaking discoveries and hindered the beginning of multidisciplinary studies approaching the challenge from several perspectives.

We are well aware that completing the project is an hard task from any point of view: it is hard on the scientific side, since it is not trivial to achieve the desired results; it is hard on the philosophical side, since an indefinite life expectancy opens up unseen ethical and social scenarios; it is hard on the technological side, since innovation always brings revolution in the way we live technology every day.

iLabs were founded in Milan in 1977 to address any research project related to the radical extension of human life. This document illustrates a coherent and full-fledged plan aiming to accelerate the accomplishment of a longer and healthier life for everyone.

To radically extend human life-span we need to:

1. ***Rethink*** scientific projects and discoveries in the light of a shared methodology.

2. ***Individuate*** what tools and theories are needed to better understand the fundamental mechanisms of aging and create a detailed plan to reach the desired intermediate results.

3. ***Develop*** a R&D model that is efficient, multidisciplinary and self-funded.

4. ***Involve*** passionate and skilled people that may help us completing the project.

The experience of thirty years of independent and autonomous research, several successful partnerships, a long-standing commitment to innovation are the foundations of our project. The more people get involved in this exciting challenge, the more chances we all have to live hundreds of years. We warmly welcome anyone who is willing to take part in our research groups or help us creating a large-scale, informed debate on these topics.

We believe that our plan is a serious and complete proposal to achieve the proposed goals. We acknowledge that the development of a project involving scientific, philosophical, technological aspects is a complex and delicate process: however, we maintain that in the long run this approach is by far the most promising.

We know that the plan requires various kinds of resources and efforts: *iLabs* business model, born out of our R&D policy, is likely to grow hand by hand with the project, thus guaranteeing sufficient funding.

We think that anyone can understand and appreciate the value of an healthy, happy and eventually indefinite life. With this document we explicitly present for the first time our vision for the near future of mankind in all the relevant aspects. We look forward to meet people willing to make this vision come true.

Antonella Canonico
Gabriele Rossi
iLabs Team

Milan, May 2010

ILABS METHODOLOGY

iLabs have been developing through years a detailed and multidisciplinary approach that draws on insights from dynamical system theory. It is within this conceptual framework that the next steps should be taken: therefore, researchers, journalists, politicians and everyone else involved are required to know and understand the core ideas of the approach.

1. Human beings are ***complex systems***, whose functional parts interact in a highly ***non-linear*** fashion. Concepts such as "health", "wellness", "biological age" are the macro-level outcomes of countless interactions, feedback and loops at the micro-level.

2. The most sophisticated behaviors as well as the worst diseases can be understood just by considering ***together*** genetic background, environmental influences and the self-referential ability. Each of these factors can act on each sub-system in a peculiar and unpredictable way: the upshot is that the ***prediction*** of a system output given a set of inputs is extremely hard.

3. A radical extension of human life-span is not likely to be achieved only with ***exogenous*** methodologies – that is, interventions on the Human System with external tools (artificial substances, stem cells, nanotechnologies, surgery, etc.). It is therefore very important that serious scientific efforts are devoted to the development of ***endogenous*** techniques – that is, interventions on the Human System based on internal resources (psychoneurophysiology, meta-cognition, etc.).

We are looking for people willing to join us and work together towards the accomplishment of the intermediate goals in each area of inquiry:

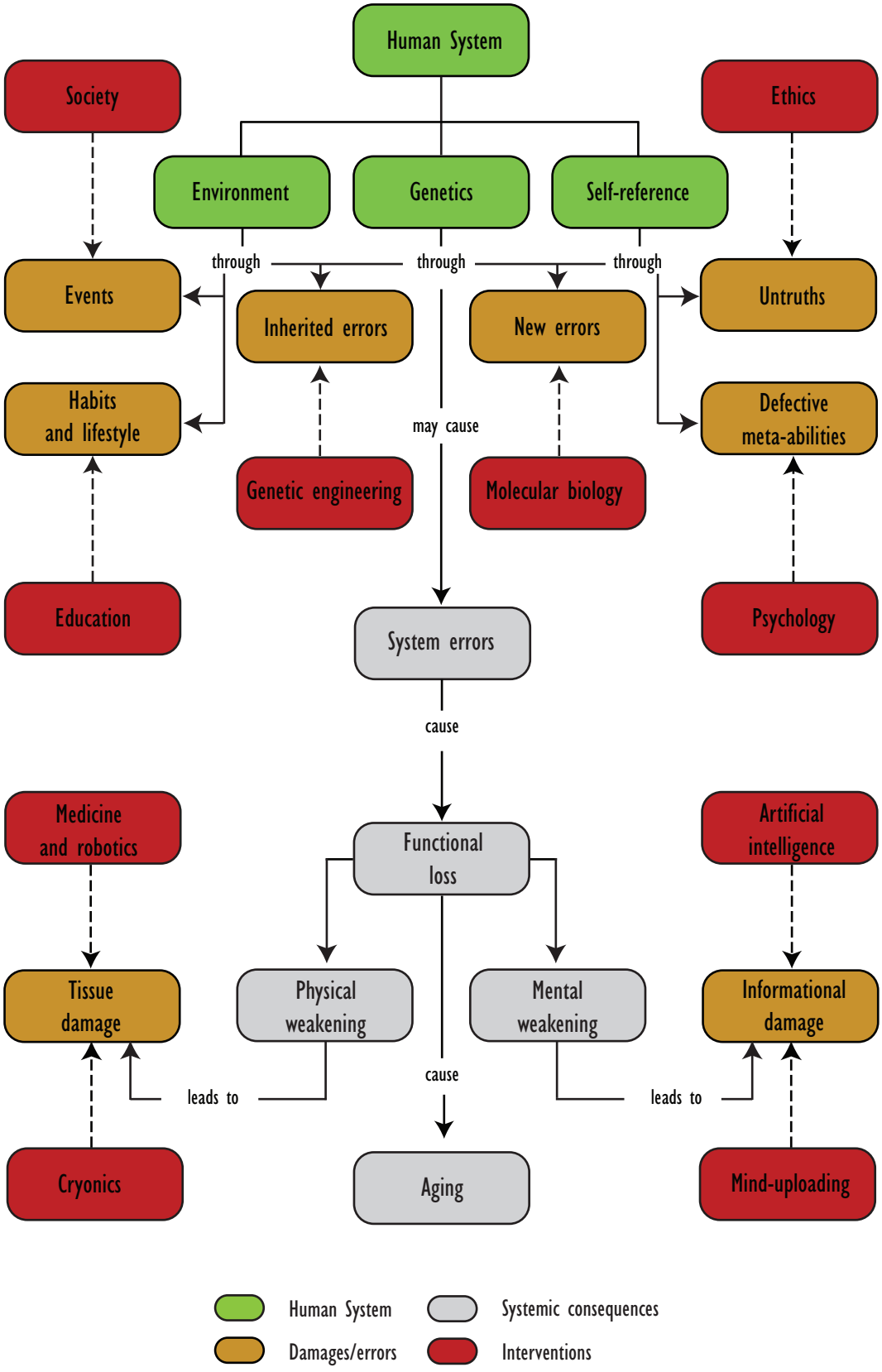
→ ***Skilled*** people with specific know-how helping accelerate the understanding of reality, human cognition and the fundamental mechanisms of aging.

→ ***Passionate*** people, with interests and values close to ours, helping change the social attitude towards the very idea of life extension through a large-scale, public debate on the relevant issues.

→ ***Research institutes*** and cultural movements sharing knowledge, experience, insights on a specific research topic.

Anyone interested in playing a role in the project should contact us as soon as possible using the following e-mail address: ***project@ilabs.it***.

ILABS PROJECT • THE SYSTEMIC APPROACH

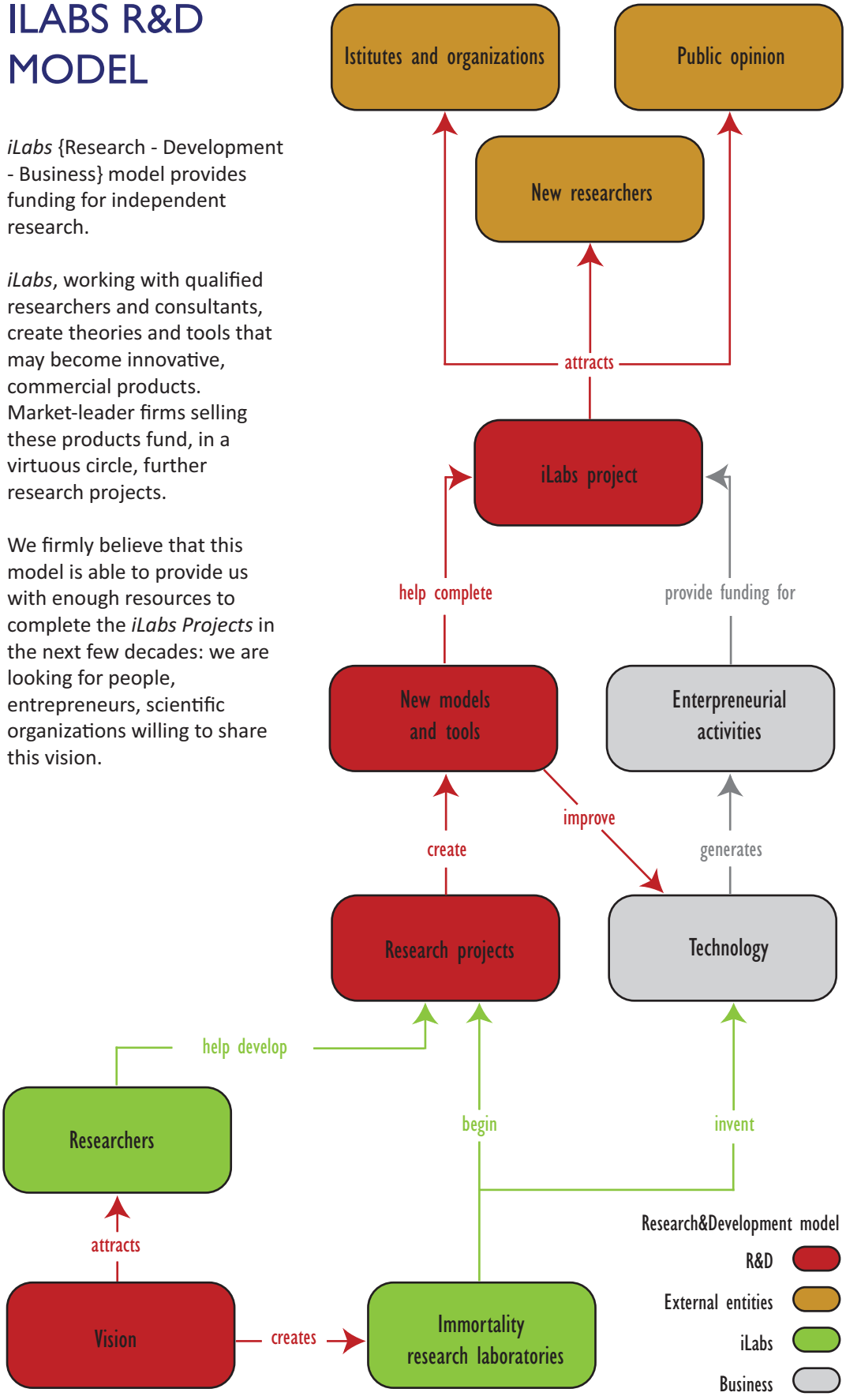


ILABS R&D MODEL

iLabs {Research - Development - Business} model provides funding for independent research.

iLabs, working with qualified researchers and consultants, create theories and tools that may become innovative, commercial products. Market-leader firms selling these products fund, in a virtuous circle, further research projects.

We firmly believe that this model is able to provide us with enough resources to complete the *iLabs Projects* in the next few decades: we are looking for people, entrepreneurs, scientific organizations willing to share this vision.



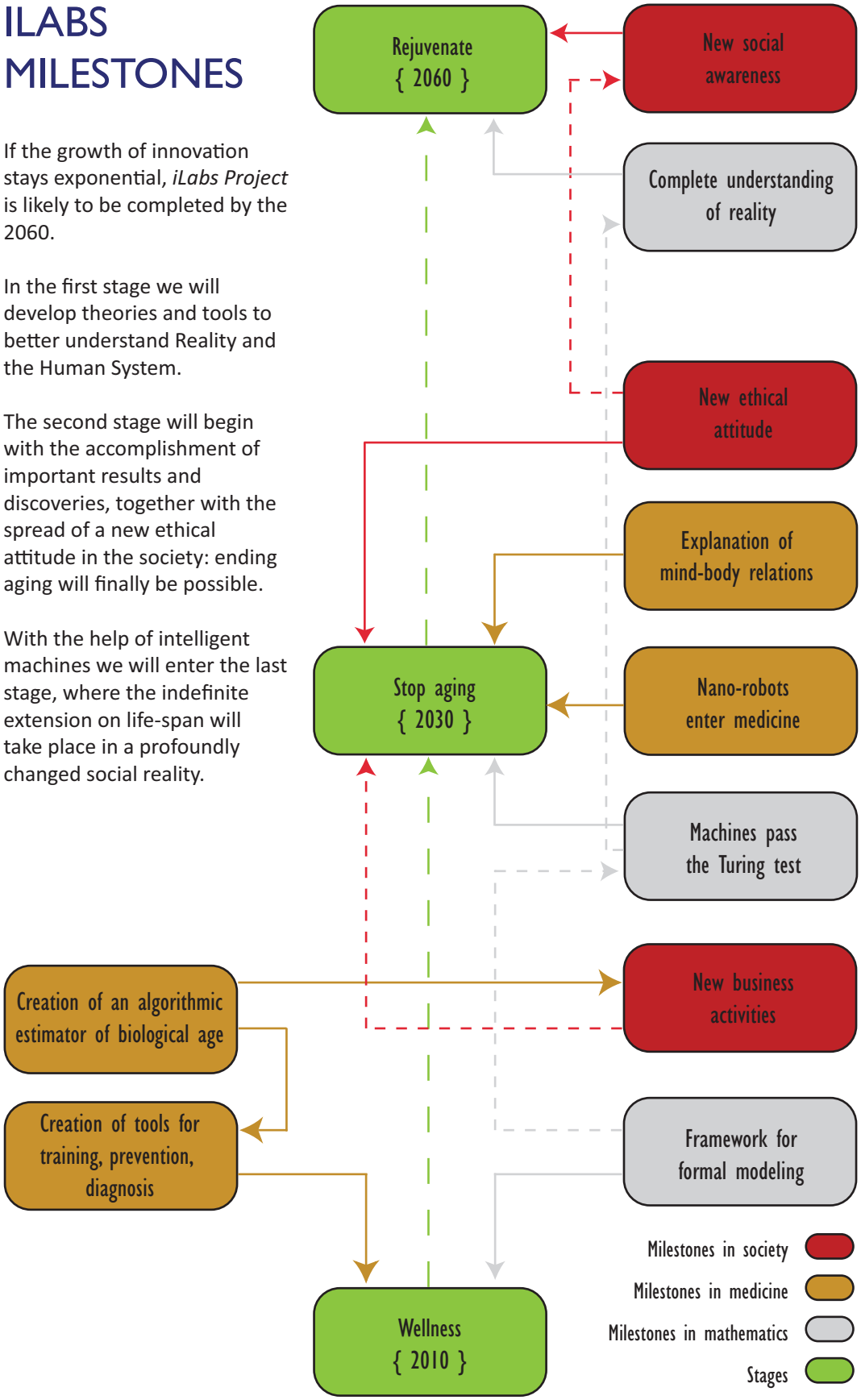
ILABS MILESTONES

If the growth of innovation stays exponential, *iLabs Project* is likely to be completed by the 2060.

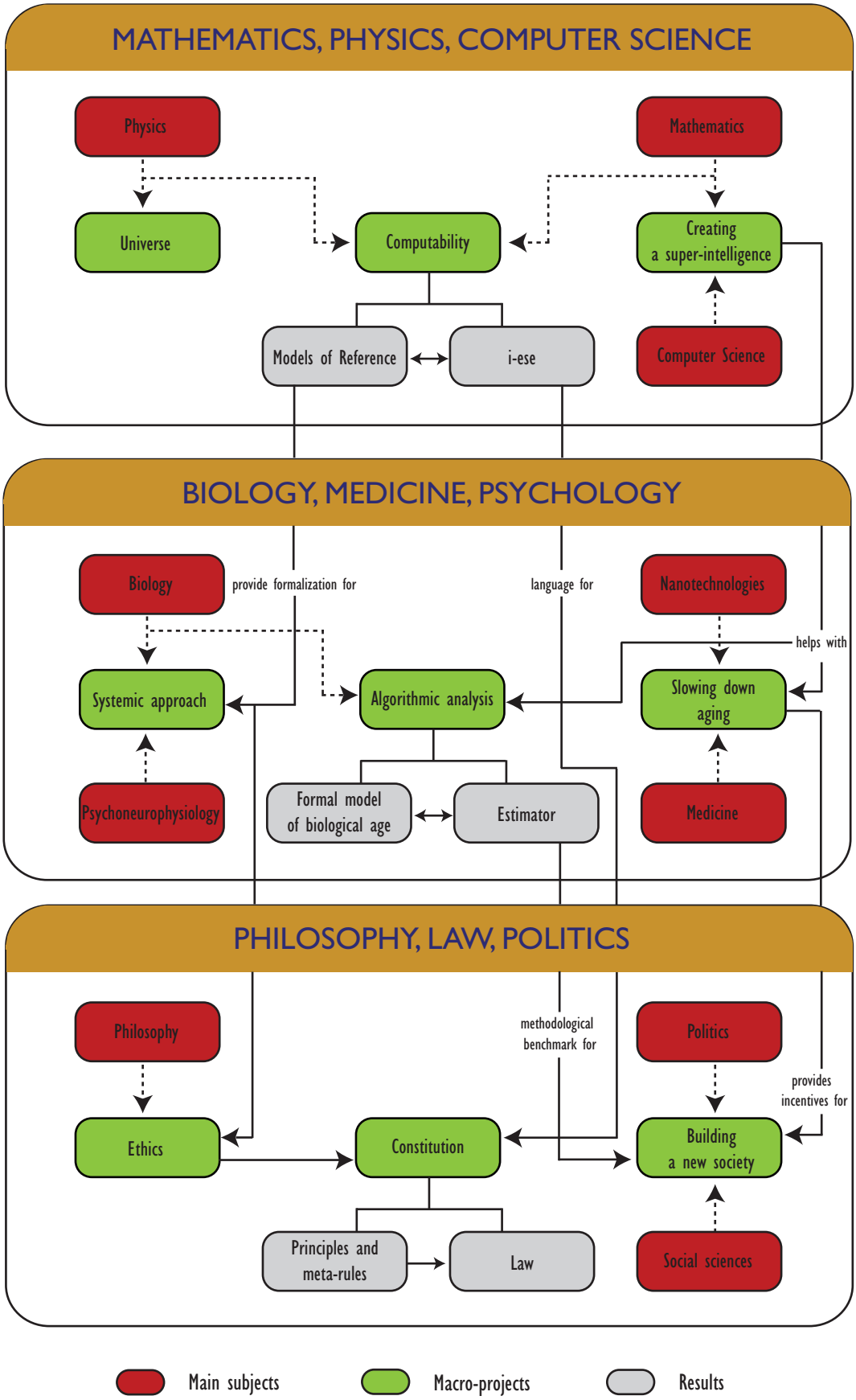
In the first stage we will develop theories and tools to better understand Reality and the Human System.

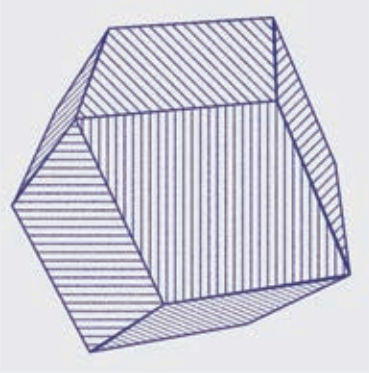
The second stage will begin with the accomplishment of important results and discoveries, together with the spread of a new ethical attitude in the society: ending aging will finally be possible.

With the help of intelligent machines we will enter the last stage, where the indefinite extension on life-span will take place in a profoundly changed social reality.



ILABS PROJECT • OVERALL STRUCTURE





ILABS PROJECT

After thirty years of research on the indefinite extension of human life-span we are ready to present a multidisciplinary, detailed program to achieve our goal. We are always ready to accept new interesting proposals and we will be pleased to hear comments and critics from you.

Part 1

MATHEMATICS, PHYSICS, COMPUTER SCIENCE

☑ CREATING A SUPER-INTELLIGENCE

Mathematical sciences study formal relations between quantitative concepts, such as numbers, and qualitative ones, such as the layman categories we use to understand the world we live in. The chances we have to achieve a radical life-span extension heavily depend on the progresses we will make in modelling reality and our mind.

The starting point of *iLabs* model is a perfect and rigorous isomorphism between matter and information: a change in the arrangement of some informational properties implies an analogous change in some physical properties. The core claim of our "intended model" is that this happens at any dimensional level, no matter how small or big is the scale. On the one hand, this means that information and computation are low-level properties that reality has always had; on the other, this perspective suggests that the physical world itself should be conceived, roughly speaking, as a big information processor.

Apart from insights from theoretical and experimental physics, the model heavily relies upon mathematical and logical tools. Mathematics helps us describe the basic relations between simple objects in the model and determine what composition rules are allowed to get complex entities out of basic ones. Logic provides us with tools and experience to solve a notational problem: the richer your language is, the harder it is to have formal deductive systems that are "well-behaved" in certain important respects.

The formal development of these intuitions is to be accomplished through the notion of "models of reference" (MoR). Formally, an MoR is an ordered triple <perception → thought → behavior >: at the lowest dimensional level, it looks like a simple change in the informational patterns of atomic physical cells; at the human level, it is what explains our behavior in terms of what we perceive and how we elaborate information. MoRs' fractal-like structure makes them suitable candidates to be a functional interface between matter and computation.

The formal work on MoRs will be the key preliminary step before the birth of "i-ese", a new language for advanced human-machine interactions: with a new programming language, directly inspired by the study of human cognition, we will be ready to create a real artificial super-intelligence, that in turn will help us solving our most pressing research challenges. The intelligent machines will have a pivotal role in understanding and explaining every single aspect of the physical universe; moreover, the indefinite extension of human life can be approached only by acquiring a complete knowledge of ourselves: without the aid of an external mind mirroring the features of our own, it is unlikely, if not impossible, that we will ever achieved it.

1.1. THE INTENDED MODEL

1.1.1. Bootstrap

1.1.1.1. Reality

1.1.1.2. The Mind

1.1.2. Matter

1.1.2.1. The physical universe
- 1.1.2.1.1. Space, time, states and rules
- 1.1.2.1.2. Dimensional levels

1.1.2.2. The fundamental nature of the physical universe
- 1.1.2.2.1. Discrete space
- 1.1.2.2.2. Local rules
- 1.1.2.2.3. Synchronous updating
- 1.1.2.2.4. The atomic cell
- 1.1.2.2.5. The problem of directional distortion
- 1.1.2.2.6. Apparent motion
- 1.1.2.2.7. Potential time

1.1.2.3. Descriptive tools for the physical universe
- 1.1.2.3.1. Discrete topology
- 1.1.2.3.2. Determinism

1.1.2.4. Theorethical-experimental issues
- 1.1.2.4.1. Computational chemistry
- 1.1.2.4.2. Quantum mechanics
- 1.1.2.4.3. The standard model of particles

1.1.3. Information

1.1.3.1. Systems
- 1.1.3.1.1. Arbitrariness
- 1.1.3.1.2. Isomorphism
  - 1.1.3.1.2.1. Spatial
  - 1.1.3.1.2.2. Dimensional

1.1.3.2. The fundamental nature of systems
- 1.1.3.2.1. Boundaries
- 1.1.3.2.2. Perception, cognition and behavior
- 1.1.3.2.3. Models of reference
- 1.1.3.2.4. The problem of completeness
  - 1.1.3.2.4.1. Decidability
  - 1.1.3.2.4.2. Exhaustivity

1.1.3.3. Modelling tools for mental reality
- 1.1.3.3.1. Qualitative computation
- 1.1.3.3.2. Recursive functions

1.1.3.4. Theorethical-experimental issues
- 1.1.3.4.1. Cellular Automata
- 1.1.3.4.2. Molecular computation

1.2. THE KEY ROLE OF COMPUTABILITY

1.2.1. Mathematics of models of reference

1.2.1.1. Axiomatic structure
- 1.2.1.1.1. Derivation from the physical universe
- 1.2.1.1.2. Matter-information isomorphism

1.2.1.2. Ontology of models of reference
- 1.2.1.2.1. Parthood
- 1.2.1.2.2. Hyper-extensionality
- 1.2.1.2.3. Stage-view
- 1.2.1.2.4. Instantaneity
- 1.2.1.2.5. Individuability
- 1.2.1.2.6. Conventionalism
  - 1.2.1.2.6.1. Unrestricted mereological composition
  - 1.2.1.2.6.2. Arbitrary cookie-cutting

1.2.1.3. Notational conventions

1.2.1.4. Formalization

1.2.1.5. Primitive models of reference
- 1.2.1.5.1. Equivalence between models of reference
- 1.2.1.5.2. Partial models of reference
- 1.2.1.5.3. Inverse models of reference
- 1.2.1.5.4. Recursive models of reference
- 1.2.1.5.5. Meta-models of reference

1.2.1.6. Generalizations
- 1.2.1.6.1. Set theory
- 1.2.1.6.2. Universal Turing Machine
- 1.2.1.6.3. Boolean algebra
- 1.2.1.6.4. Functional programming languages

1.2.2. “i-ese”

1.2.2.1. A universal language
- 1.2.2.1.1. Derivation from the mathematics of models of reference
- 1.2.2.1.2. Men and machines

1.2.2.2. Semantics
- 1.2.2.2.1. Identification of primitive concepts
  - 1.2.2.2.1.1. Evolutionary perspective
  - 1.2.2.2.1.2. Functional perspective

1.2.2.3. Sintax
- 1.2.2.3.1. Identification of primitive operators
  - 1.2.2.3.1.1. Evolutionary perspective
  - 1.2.2.3.1.2. Functional perspective

1.2.2.4. Lexicon
- 1.2.2.4.1. Identification of primitive signs
  - 1.2.2.4.1.1. Evolutionary perspective

1.2.2.4.1.2. Functional perspective

1.2.2.5. Translation into other languages
1.2.2.5.1. Natural languages
1.2.2.5.2. Artificial languages

1.2.2.6. Translation from other languages
1.2.2.6.1. Natural languages
1.2.2.6.2. Artificial languages

1.3. CREATING A SUPER-INTELLIGENCE

1.3.1. The replication of human mind

1.3.1.1. Models of reference as an algebra of thought

1.3.1.2. Mind operating system
1.3.1.2.1. Memory
1.3.1.2.1.1. Reality and the set of perceptions
1.3.1.2.1.2. The set of thoughts
1.3.1.2.1.3. The set of behaviors and reality
1.3.1.2.2. Organization of the basic modules

1.3.1.3. The fragmentation of human reasoning
1.3.1.3.1. The logical reasoning
1.3.1.3.2. The analogical reasoning
1.3.1.3.3. The practical reasoning

1.3.1.4. Learning processes
1.3.1.4.1. From chaos to signs
1.3.1.4.1.1. Sense organs
1.3.1.4.1.2. Looking for regularities
1.3.1.4.2. From signs to values
1.3.1.4.2.1. Clustering
1.3.1.4.3. From values to meanings
1.3.1.4.3.1. Modeling the external world
1.3.1.4.3.2. Emergence of symbols
1.3.1.4.4. From meanings to understanding
1.3.1.4.4.1. Meta-modeling
1.3.1.4.4.2. Emergence of rules
1.3.1.4.5. From understanding to knowledge

1.3.1.5. Emotions
1.3.1.5.1. Assigning weights
1.3.1.5.2. Identification of primitive emotions
1.3.1.5.2.1. Evolutionary perspective
1.3.1.5.2.2. Functional perspective
1.3.1.5.3. The nature of emotions

1.3.1.6. Creativity
1.3.1.6.1. Emergence of creativity
1.3.1.6.1.1. Causal factors
1.3.1.6.1.2. Random factors
1.3.1.6.2. Creativity and evolution

1.3.1.7. Consciousness
1.3.1.7.1. The self-referential module
1.3.1.7.2. Ethical framework
1.3.1.7.3. Aesthetical framework
1.3.1.7.4. The nature of consciousness

1.3.1.8. Language
1.3.1.8.1. Culture as a convention
1.3.1.8.2. Shared models of reference
1.3.1.8.3. Individual models of reference

1.3.2. The road to super-intelligence

1.3.2.1. Identification of the milestones
1.3.2.1.1. Quantitative milestones
1.3.2.1.2. Qualitative milestones

1.3.2.2. Sharing knowledge
1.3.2.2.1. Answering any question
1.3.2.2.2. Modeling reality
1.3.2.2.3. Mind reverse engineering

1.3.2.3. Helping the extension of human life-span
1.3.2.3.1. Endogenous aspects
1.3.2.3.2. Exogenous aspects

Part 2

BIOLOGY, MEDICINE, PSYCHOLOGY

☑ SLOWING DOWN AGING

The improvement of medicine and surgery, the discoveries of molecular biology, the progresses made by psychologists and cognitive scientists in the second half of the last century laid down the foundations for an exponential growth in the quantity and quality of the possible interventions to protect our health. Nonetheless, the technological innovations seem to be able to produce concrete results only in well-defined, delimited fields, while bigger and pressing questions are left unanswered due to the lack of a shared common vision. On the contrary, *iLabs* scientific program is characterized by a true multidisciplinary approach to aging, a systemic vision of human abilities and diseases, a quantitative approach to diagnosis and prevention.

The multifactorial approach emphasizes that a patient's health is always to be analyzed as the final outcome of the complex (and often non-linear) interplay between three components: the environment, the genetic dispositions, the ability of self-monitoring and self-recovering. The functional mapping of DNA, the understanding of the true relation between inherited and acquired traits, the discovery of the mechanism that rules mind-body feedbacks and dynamics: these three intermediate goals will result in a sudden and somewhat unpredictable improvement in our ability to understand diseases and develop new endogenous and exogenous tools to be used in medical treatment.

Considering a person as a "complex system" made up of other, smaller systems (organs, tissues, cells, etc.) is an important step towards the explanation of the tricky interplay between physical and mental causal patterns. Complexity, however, has its own complex rules, so that new models and technology are needed to address the challenge: unless we find a reliable estimator of human functional efficiency, we will never know for sure whether a new discovery is effective in fighting aging or not. In the first stage of the project, absolute priority should be given to the development of an algorithm that, given a set of functional and probabilistic parameters, quantifies wellness and efficiency.

The systemic approach opens new possibilities and new challenges for the whole society: if a pathology is nothing more (and nothing less) than a system error, we should coordinate endogenous, exogenous and social interventions in order to fight it. The upshot is that a new sense of responsibility is required: a radical extension of life-span can only be achieved through a continuous training of our physical, mental and behavioral efficiency.

2.1. SYSTEMIC APPROACH TO HUMAN HEALTH

2.1.1. Systemic components

2.1.1.1. Genetics
- 2.1.1.1.1. Genetic models of reference
  - 2.1.1.1.1.1. Physical traits
  - 2.1.1.1.1.2. Mental traits
- 2.1.1.1.2.Variability of genetic models of reference
  - 2.1.1.1.2.1. Local variability
  - 2.1.1.1.2.2. Temporal variability

2.1.1.2. Environment
- 2.1.1.2.1. Interplay between genetic models of reference and environment
- 2.1.1.2.2. Acquired models of reference
- 2.1.1.2.3. Inheritance of acquired models of reference

2.1.1.3. Self-modifying abilities
- 2.1.1.3.1. Self-referential models of reference

2.1.2. Models and meta-models

2.1.2.1. Physiological system
- 2.1.2.1.1. Identification of sub-systems
  - 2.1.2.1.1.1. Evolutionary perspective
  - 2.1.2.1.1.2. Functional perspective

2.1.2.2. Mental system
- 2.1.2.2.1. Identification of sub-systems
  - 2.1.2.2.1.1. Evolutionary perspective
  - 2.1.2.2.1.2. Functional perspective

2.1.2.3. Homeostatic meta-model
- 2.1.2.3.1. Identification of feedbacks
- 2.1.2.3.2. Identificazione of layers

2.1.2.4. Human system
- 2.1.2.4.1. Identification of meta-rules
- 2.1.2.4.2. Identification of weights

2.2. THE KEY ROLE OF REALIABLE ESTIMATORS

2.2.1. Biological age

2.2.1.1. Probabilistic perspective

2.2.1.2. Functional perspective

2.2.2. Estimator

2.2.2.1. Identification of probabilistic markers
- 2.2.2.1.1. ECG
- 2.2.2.1.2. EEG
- 2.2.2.1.3. Blood test parameters
- 2.2.2.1.4. Spirometry

2.2.2.2. Identification of functional markers
- 2.2.2.2.1. Cellular level
- 2.2.2.2.2. Physiological sub-systems
- 2.2.2.2.3. Mental sub-systems

2.2.2.3. Mathematical model of biological age
- 2.2.2.3.1. Joint probabilities
  - 2.2.2.3.1.1. Equiprobable clustering
  - 2.2.2.3.1.2. Equispatial clustering
- 2.2.2.3.2. Probability distributions
  - 2.2.2.3.2.1. Identification basic varieties
- 2.2.2.3.3. Validation
  - 2.2.2.3.3.1. Qualitative aspects
  - 2.2.2.3.3.2. Quantitative aspects

2.2.2.4. Application protocol
- 2.2.2.4.1. Scope
  - 2.2.2.4.1.1. Time-series analysis
  - 2.2.2.4.1.2. Cross-sectional analysis
- 2.2.2.4.2. General guidance
- 2.2.2.4.3. Updating process

2.3. SLOWING DOWN AGING

2.3.1. Aging and pathologies

2.3.1.1. Aging factors
- 2.3.1.1.1. Genetic factors
- 2.3.1.1.2. Environmental factors
- 2.3.1.1.3. Self-referential factors

2.3.1.2. Pathologies as system errors
- 2.3.1.2.1. Genetic errors
- 2.3.1.2.2. Adaptation errors
- 2.3.1.2.3. Self-referential errors

2.3.1.3. Assessing the effectiveness of anti-aging methodologies
- 2.3.1.3.1. Probabilistic aspects
- 2.3.1.3.2. Functional aspects
- 2.3.1.3.3. General conditions for the proper use of the estimators.

2.3.2. Exogenous methodologies for the extension of life-span

2.3.2.1. Nutrition
- 2.3.2.1.1. Kinds of diets
- 2.3.2.1.2. Dietary supplement

2.3.2.2. Biology
- 2.3.2.2.1. Epigenetics
- 2.3.2.2.2. Apoptosis and oncogenesis

2.3.2.3. Chemistry
- 2.3.2.3.1. Substances acting on causes
- 2.3.2.3.2. Substances acting on effects

2.3.2.4. Surgery
- 2.3.2.4.1. General guidance
- 2.3.2.4.2. Stem cells
- 2.3.2.4.3. Transplants
- 2.3.2.4.4. Artificial organs
- 2.3.2.4.5. Nanotechnologies

2.3.3. Endogenous methodologies for the extension of life-span

2.3.3.1. Training the physiological system
- 2.3.3.1.1. Improving power

2.3.3.1.2. Improving sensitivity
2.3.3.1.3. Optimizing energy spending

2.3.3.2. Training the mental system
2.3.3.2.1. Improving intelligence
2.3.3.2.2. Improving awareness
2.3.3.2.3. Optimizing decision-making

2.3.3.3. Training the Human System
2.3.3.3.1. Improving will
2.3.3.3.2. Improving adaptivity
2.3.3.3.3. Ottimizzare behavioral efficiency

2.3.4. Social methodologies for the extension of life-span

2.3.4.1. Law
2.3.4.1.1. Protecting truth
2.3.4.1.2. Protecting individuals

2.3.4.2. Management of epidemiological databases
2.3.4.2.1. Centralizing information
2.3.4.2.2. Transparency

2.3.4.3. Arrangement of health care centers
2.3.4.3.1. Diagnosis and prevention
2.3.4.3.2. Vocational training

2.3.5. Causes of death

2.3.5.1. Epidemiological inquiries
2.3.5.1.1. Time-series data
2.3.5.1.2. Cross-sectional data

2.3.5.2. Identification of the main causes
2.3.5.2.1. Systemic approach to clustering

2.3.5.3. Identification of the main correlations
2.3.5.3.1. Positive correlations
2.3.5.3.2. Negative correlations

2.3.5.4. Avoidable mortality
2.3.5.4.1. Avoidability levels
2.3.5.4.1.1. Individual avoidability
2.3.5.4.1.2. Social avoidability

2.3.6. Stopping the clock

2.3.6.1. Cryonics
2.3.6.1.1. Preserving the body
2.3.6.1.2. Preserving the mind

2.3.6.2. Mind-uploading
2.3.6.2.1. The problem of the dimensions involved

Part 3

PHILOSOPHY, LAW, POLITICS

☑ BUILDING A NEW SOCIETY

Habits, lifestyles, values and social structures are to be partially (if not totally) changed as long as we are approaching the indefinite extension of our life-span. Ending aging will in turn result in revolutionary consequences in the way our everyday life is lived. This new and unparalleled freedom should incentive a critical rethinking of ethical, political and social systems as they are currently conceived. The absolute respect for the value of truth, the possibility of autonomous associations between individuals, and the right to pursue one's own wellness will be the fundamental principles of human society in the near future.

Amazed by the ground-breaking discoveries of science, we are likely to underestimate the need of a parallel revolution in our life. It is the knowledge of reality that brings us nearer to the goal: therefore, its faithful and objective description – so-called "truth" – will be ranked first among the fundamental values. The technological growth will hopefully help us remove all the unconscious untruths, but the burden of the conscious one will be left to individuals and society. In a world where human beings and intelligent machines will have analogous abilities, a defective and superficial ethical debate on the proper use of innovation will cause inefficiencies and delays that could otherwise be avoided.

The formal tools inherited by mathematical sciences will be the basic bricks for the construction and implementation of new laws: the "social contract" will be signed by any person willing to join a society ruled by a rigorous, unambiguous constitution. The perfect understanding of the physical and mental universe and a new formal language will make possible algorithmic procedures in every aspect of the administration of justice. Science and technology will radically revolution society, from education to healthcare, from economy to entertainment.

If a serious and informed debate on these topics does not influence the public opinion, the political agenda, the education of our best and brightest students, the accomplishment of *iLabs project* will be delayed due to the lack of laws, funding and people worth the challenge we are facing. On the other hand, we firmly believe that it is a short-sighted, ineffective policy to pursue a radical technological growth without taking into account the relevant ethical and social issues. The way we will live our lives in the next thirty – three hundred, three thousand – years heavily depends on the choices we will all make in the next few days.

3.1. THE ETHICS OF TRUTH

3.1.1. Ethical principles

3.1.1.1. Ethics and conventionalism

3.1.1.2. Reality

3.1.1.2.1. The correct description of reality as the fundamental principle

3.1.1.2.2. Identification of the main sources of untruths

3.1.1.2.2.1. Conscious level

3.1.1.2.2.2. Unconscious level

3.1.1.2.3. Truth and the extension of life-span

3.1.1.2.3.1. Models of reference involved

3.1.1.2.3.2. Approaching truth

3.1.1.3. Harmony

3.1.1.3.1. Free agreement among individuals as the second principle

3.1.1.3.2. Identification of the main kinds of agreement

3.1.1.3.3. Love and the extension of life-span

3.1.1.3.3.1. Models of reference involved

3.1.1.3.3.2. Approaching love

3.1.1.4. Human flourishing

3.1.1.4.1. Fulfillment of goals as the third principle

3.1.1.4.2. Identifications of the main goals

3.1.1.4.3. Happiness and the extension of life-span

3.1.1.4.3.1. Models of reference involved

3.1.1.4.3.2. Approaching happiness

3.1.1.5. The power of will

3.1.1.6. Models of reference and free will

3.1.1.7. Deciding what is right

3.1.1.8. Neuroethics

3.1.1.9. Comparison with popular rankings of values

3.1.2. Aesthetical principles

3.1.2.1. Aesthetics and conventionalism

3.1.2.2. The constitution of aesthetical judgement

3.1.2.2.1. Universality

3.1.2.2.2. Completeness

3.1.2.2.3. Harmony

3.1.2.2.4. Novelty

3.1.2.2.5. Essentiality

3.1.2.3. Aesthetics and models of reference

3.1.2.3.1. Inherited models of reference

3.1.2.3.2. Acquired models of reference

3.1.2.3.3. Art

3.1.2.4. Quantifying beauty

3.1.2.5. Neuroaesthetics

3.1.2.6. Comparison with popular rankings of preferences

3.2. THE KEY ROLE OF SOCIAL LAWS

3.2.1. General guidance

3.2.1.1. Law and conventionalism

3.2.1.2. Hierarchy of fundamental principles

3.2.1.3. The axiom of convergence

3.2.1.4. Intrinsic variability of norms

3.2.1.5. Computability of social laws

3.2.1.5.1. Notational conventions

3.2.1.5.2. Formalization

3.2.2. Constitution

3.2.2.1. Building a society through a temporary agreement among individuals

3.2.2.1.1. Aims

3.2.2.1.2. Admission

3.2.2.1.3. Governance

3.2.2.2. Fundamental principles

3.2.2.2.1. Reality

3.2.2.2.2. Harmony

3.2.2.2.3. Human flourishing

3.2.2.3. Relations among individuals

3.2.2.3.1. Truth as a right and a duty

3.2.2.3.2. The principle of free agreement

3.2.2.3.3. Reversal of responsibility criteria

3.2.2.4. Relations between individuals and society

3.2.2.4.1. Fulfillment of goals as a right and a duty

3.2.2.4.2. The principle of request

3.2.2.4.3. The principle of demanding

3.2.2.4.4. Identification of the greatest punishment

3.2.2.5. Relations with other societies

3.2.2.5.1. Identification of cooperational rules

3.2.2.5.2. Identification of defensive rules

3.2.2.6. Relations with other systems

3.2.2.6.1. Identification of cooperational rules

3.2.2.6.2. Identification of defensive rules

3.3. BUILDING A NEW SOCIETY

3.3.1. Projects

3.3.1.1. Health care

3.3.1.1.1. iMed

3.3.1.2. Entertainment

3.3.1.2.1. Club iLabs

3.3.1.2.2. The DreamRoom

3.3.1.3. Business

3.3.1.3.1. Aleph Insurance

3.3.1.3.2. “i-10”

3.3.1.3.3. iAssicur

3.3.1.3.4. ZaZen

3.3.1.4. Administration of justice

3.3.1.4.1. iMaat

3.3.1.5. Education

3.3.1.5.1. Master iSFT

3.3.1.5.2. NoName Project

3.3.2. The great players

3.3.2.1. The "Game" approach

3.3.2.1. The history of mankind

3.3.2.1.2. Great civilizations

3.3.2.1.3. Scientific discoveries

3.3.2.2. Past great players

3.3.2.3. Today great players

3.3.2.4. The game solution

3.3.3. Spreading the idea of semi-immortality

3.3.3.1. Media

3.3.3.2. Partnerships

3.3.3.2.1. Organizations

3.3.3.2.2. Firms

3.3.3.2.3. Governments

3.3.3.2.4. Institutions

3.3.3.3. Semi-Immortality clubs

3.3.3.4. Publications

3.3.3.4.1. Mathematics-physics-computer science

3.3.3.4.2. Biology-medicine-psychology

3.3.3.4.3. Philosophy-law-politics

3.3.3.5. iLabs scientific prizes

Contributors:
Francesco Berto, Ph.D., Aberdeen University, Aberdeen
Paolo Sommaggio, Ph.D., University of Trento, Trento
Marta Rossi, M.A., iLabs, Milan
Under the supervision of:
Jacopo Tagliabue, M.A., iLabs, Milan