

# ICT for Brain, Body & Behavior

Annual Report 2017



The i3B network strives for collaboration and impact with innovative ICT solutions to monitor brain, cognition, physiology and behavior.



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# MANAGEMENT SUMMARY

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The i3B innovation network is in a transition period. The network strives for more collaboration and societal impact with our innovative ICT based solutions on brain, cognition, physiology and behavior. Resulting also in more financial resources for the i3B foundation, to run the network. In this respect, the i3B strategy was *'tuned'* in 2017 in close collaboration with the network and external experts.

i3B fosters the valorisation of digital monitoring solutions for humans and animals. The strategy is to define focus areas within which i3B participants will collaborate. Collaboration is organized in small dedicated groups, so called Special Interest Groups (SIGs). i3B set up the first SIGs in 2017, in the field of Human Factors and Animal Monitoring. The SIGs establish a joint innovation agenda and organize projects to execute the agenda. The agendas will be aligned with European agendas. i3B will expand the network with participants that add value to these agendas and projects. i3B will last but not least participate more often as a partner in projects, with concrete tasks in project execution (e.g. project management, dissemination).

i3B realized most of her ambitions in 2017: **Connect** stakeholders in joint agenda's and events. **Innovate** by establishing innovation projects, **Accelerate** the business of her participants by matchmaking events, **Learn** through coaching of SME's and **Expand, Promote** the network. A detailed overview is presented hereunder:

- **Connect.** A Healthy Lifestyle agenda was published in 2017 together with innovation networks Health Valley NL and Food Valley NL. Thanks to this collaboration i3B forms the largest SME network in the East of the Netherlands. i3B prepared also an agenda (white paper) on human factors, coordinated by Thales Netherlands in collaboration with the newly established SIG Human Factors. A SIG Animal Monitoring was also launched in 2017. i3B organized last but not least the anticipated 10 *'Connect'* events: Neurovation, co-organized with the Donders Institute was by far the most successful annual event in our five year history with over 150 participants, strengthening the i3B brand awareness.
- **Innovate.** i3B submitted thirteen subsidy applications (goal 10) with two or more participants or the i3B foundation as a beneficiary. i3B was for the first time project beneficiary in 2016, herewith multiplying participant contributions. At the beginning

of 2018 i3B is already five times beneficiary in subsidy applications: i3B submitted furthermore a European Science and Technology (COST) network application, and two EFRO cluster and network applications. i3B will develop agendas, projects aligned with the new strategy when the applications are successful. Results on the subsidy applications are expected by April 2018. A leaflet with an overview of i3B project services was also published in 2017. Other successful innovation projects were amongst others a belt for visually impaired persons to recognize facial expressions and a monitoring system to prevent poaching of herds in Africa.

- **Accelerate.** i3B accelerated business of her participants by amongst others a match-making event *‘Wageningen University meets i3B on Animal Monitoring’*, and a *‘Healthy Lifestyle’* matchmaking event with over 80 participants in Nijmegen. A new, highly appreciated collaboration format was the design challenge initiated in collaboration with hospital Gelderse Vallei, on how to monitor the health of breast cancer patients after surgery.
- **Learn.** i3B coached several participants on entrepreneurship in 2017. The coaching was part of the *‘Win a coach’* competition, organized with DOON coaching professionals. Coaching is a new activity for the i3B foundation, to be evaluated in 2018. Initial feedback was very positive.
- **Expand/Promote.** i3B was continuously able to grow the network and revenues, since the start of the foundation in 2012. The ambitious revenue goal for 2017 was set at € 150.000 based on hiring a business developer for 2 days a week. i3B was not able to attract a proper candidate. i3B lowered therefore the revenue ambition for participants to € 120.000, which was achieved. i3B hired two project developers instead. One project development on *‘automatic oestrus detection in sows’* was not successful. The results for the other project development, review of the COST subsidy application, are expected February 2018. Thanks to the new SIG model of collaboration, i3B had the first commitment of a large company to join the network.

The promotion goals were also achieved; publishing newsletters, regular website updates, a price competition, and LinkedIn group updates. By the end of 2017, we had 39 members in the LinkedIn group.

Enjoy reading and looking forward to connect and innovate in 2018.

# INTRODUCTION

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## 1.1 Ambition

ICT for Brain, Body and Behavior (i3B) aims to be the European independent network of ICT companies and knowledge institutes in the field of brain, cognition, physiology and behavior.

*‘Our participants jointly investigate, develop and commercialize software tools and practical solutions for accurate measurement, powerful analysis and meaningful feedback.’*

## 1.2 Mission

The i3B mission is to connect science and business, innovate through joint R&D projects, accelerate business and train and foster career opportunities within the network, facilitated by (field) labs.

i3B is an independent network, working closely together with the Dutch National Initiative Brain and Cognition (NIHC). i3B develops ICT tools to measure, analyze and provide feedback on brain, body and behavior; in a wide variety of circumstances such as eating, buying, driving, human-system interaction, moving (sports, elderly), stress, social interaction, psychiatric disorders, sleep quality, precision livestock farming, animal monitoring and Human Factors. The partners in the i3B network contribute by delivering advanced measurement, analysis or feedback components, hardware or software, which are integrated into multimodal systems and practical solutions.



Figure 1. VicarVision - Emotion recognition software for the elderly in a nursing home.



Figure 2. i3B consortium - Driving behavior simulator.



Figure 3. i3B consortium - Simulator to measure for buying behavior in a virtual supermarket.

A selection of ICT solutions out of the i3B network to illustrate the abilities of the network: ergonomic body posture advisor, a simulator for measuring consumers' buying behavior in a virtual supermarket, a simulator that measures driver behavior, emotion and task performance, emotion recognition software for the elderly in a nursing home and an innovative neuro- and biofeedback system.

### 1.3 Application domains

The i3B participants jointly investigate, develop and commercialize software tools and practical solutions for accurate measurement, powerful analysis and meaningful feedback with societal impact in four main application domains: Health, Food, Mobility and Security.



Figure 4. i3B application domains.

i3B established two Special Interest Groups (SIGs) in the field of Human Factors and Animal Monitoring. Please find below a short introduction which elaborates on the focus of the SIGs.

1. Monitoring Healthy lifestyle
2. Monitoring Animals
3. Monitoring Human Factors (workload)

A short introduction:

#### 1. Healthy Lifestyle

i3B joined forces with Health Valley NL and Food Valley NL in the European funded project C.I.A.L.E. (Connect, Innovate, Accelerate, Learn and Expand). Thanks to this cooperation, the participants form, the largest SME network in the east Netherlands region. As part of the C.I.A.L.E. project a Healthy Lifestyle innovation agenda has been established. The purposes of the innovation agenda are to connect science and businesses around

the Healthy Lifestyle theme, to realize joint funded R&D projects and to realize healthy lifestyle innovations: a priority for 2017 and onwards. The innovation agenda is available upon request.

Figure 5 gives a schematic overview of your healthy lifestyle cycle. Your health status is determined by factors like how much you move, eat, sleep, socially interact and your DNA profile. Ultimately the (R&D) efforts lead to an integrated, user friendly sensor based ICT solution to continuously monitor your healthy lifestyle and goals and provide meaningful and motivating feedback on your healthy lifestyle.

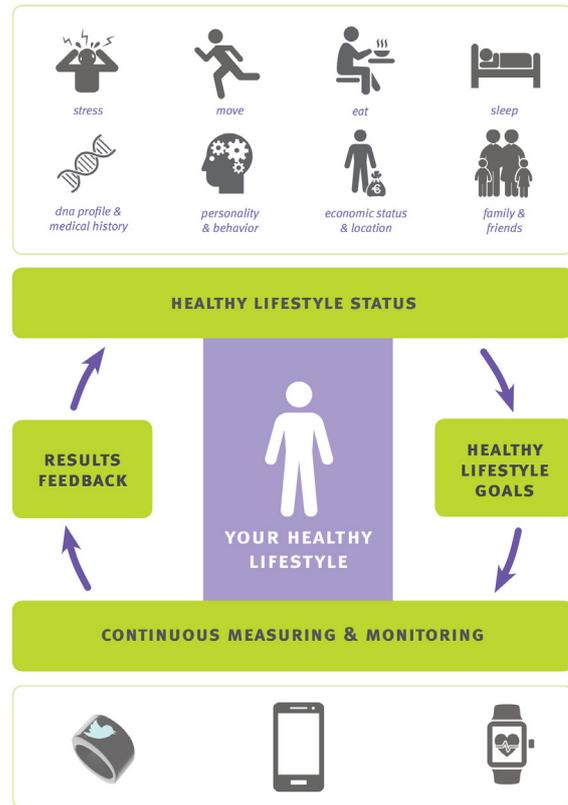


Figure 5. ICT solutions for a Healthy lifestyle.

## 2. Monitoring animal behavior and wellbeing

Our participants jointly investigate, develop and commercialize software tools and practical solutions for accurate measurement, powerful analysis and meaningful feedback on animal behavior. Animal behavior is studied in a wide variety of ways. Wildlife monitoring solutions are key to preserve endangered species. In livestock, pigs, cows and chickens are monitored with sensors and camera images for growth, fertility and health. For example, forage and antibiotics may be tailored to the needs and the welfare of the individual animal (figure 6). The great promise of this so called precision livestock farming is higher revenues combined with sustainability and more attention for animal welfare. There are also risks: if the farmer looks at the situation of the stable via a tablet or mobile phone, this could lead to less contact with the animals at the expense of animal welfare. The smart technologies also contribute to the further expansion and industrialization of livestock production but also for a possible niche market, such as organic meat from the region. The translational aspect of human and animal behavior will be addressed.

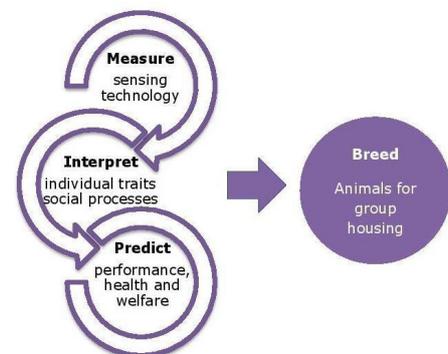


Figure 6. Measure, Interpret and Predict animal performance, health and welfare.

### 3. Workload monitoring

Determine cognitive, mental (stress) workload for operators of cars, trains, boats and airplanes. The need exists for a non-invasive, objective, validated, automatic measurements of cognitive workload. Participants like Thales, NLR, MARIN, Noldus IT, Eagle-science, Elitac and others collaborate to set the Human Factors ambition and develop (R&D) programs to tackle the challenge. A white paper has been written in 2017.



Figure 7. Workload monitoring.

## 1.4 Strategy

i3B organized strategy sessions in 2017. A Lego serious play strategy session was organized with Executive and Supervisory Board members and external experts. The program and a full report of this strategy session are available upon request. With executive board members, i3B also executed a SWOT analysis. The SWOT summary is stated hereunder. From the confrontation matrix, also part of the SWOT analysis, i3B derived the new strategy, which is described in the six bullet points stated below:

### SWOT

#### Strengths

1. Unique network due to cross-overs ICT, Brain, Body & Behavior.
2. Ability to connect Science and Business.
3. Strong domain focus, scientific values and high quality innovative products.

#### Weaknesses

1. Strong dependence on a few big financiers.
2. Weak financial base, low manpower.
3. Limited track record of projects from which i3B is paid.
4. Few larger companies with impact among i3B participants.

## Opportunities

1. Global attention for Brain/Body/Behavior, Sensor Technology, Internet of Things and our application domains.
2. Growing need for joint/open innovation and public-private partnerships and urge/coercion from NL government and subsidies towards more public-private partnerships.
3. Grant for i3B by taking part in R&D projects because most SMEs do not like the management of collaboration projects and dissemination tasks.
4. Special Interest Groups/Mini clusters in startup phase.

## Threats

1. Low willingness to pay for i3B services.
2. Increasing competition with other cluster organizations.

## Strategy

### 1. Focus & impact

The i3B application domains are: health, food, mobility and security. In 2017, i3B decided to focus her attention from project-related activities to more specific areas, in line with the needs and application domains of our participants; Animal Monitoring, Human Factors and Healthy Lifestyle. The aim is to achieve more matches between science and business, more joint projects leading *to more social and business impact for the i3B network*.

### 2. Organization: Special Interest Group model

i3B established Special Interest Groups (SIGs) on Human Factors and Animal Monitoring in 2017. The SIG collaboration model is characterized by a demarcated ambition/innovation agenda, a relatively small group of i3B participants that trust each other, with knowledge and impact in the specific domains and last but not least a mentality of getting things done. The SIG review was positive. Preparations for a third SIG on Healthy Lifestyle have started, expected to be launched mid-2018. i3B aligns all activities, organizing matchmaking events, promotion and realizing projects within SIGs.

### 3. Set and influence innovation agendas

i3B was founded by the National Initiative Brain and Cognition. Herewith, i3B is closely connected to the The Hague strategic agendas. i3B would like to set, have however more influence on innovation agendas, leading to more impact for the i3B network. The strategy is that SIGs define their own demarcated ambition/innovation agendas and apply for so called (EU) network subsidies. These subsidies enable parties to prepare innovation agendas and form, expand the SIG network with relevant other partners in the Netherlands and Europe. The innovation agenda forms the umbrella for follow up valorization projects. When the value of the innovation agenda is recognized and backed up by the relevant partners, the social and business impact can and will be significant.

The status of the innovation agendas and network subsidy applications differ per SIG. The SIG Human Factors prepared a white paper in 2017, expected to be presented January 2018. The SIG Animal Monitoring worked in 2017 on an application for a network subsidy beginning of 2018. On healthy lifestyle, i3B has a running cross-over project, C.I.A.L.E. in which a limited innovation agenda was prepared. As a follow up action, i3B also submitted a European Science and Technology (COST) network application on Food & Health. Result is expected in February 2018. And a Food & Cognition EFRO cluster application, result expected end of April 2018.

#### **4. Expand i3B network with larger companies and knowledge institutes**

In recent years the i3B network grew substantially, mainly with knowledge institutes and small companies. Science and business matches and joint projects were however mostly realized with a very limited number of larger SME companies within the i3B network. With these larger parties there was a fit with knowledge institutes on innovation roadmap, means, continuity requirements etc. Unfortunately, two knowledge institutes recently decided to cancel their participation in i3B, with this in mind. This keeps the financial basis of i3B fragile. i3B is in transition and confident for the future. The main reason is the new focus and the SIG model of collaboration. Most promising is the agreement with Thales to join i3B, based on this new SIG model of collaboration. The strategy is to further expand the network with larger companies. It makes match-making and establishing joint projects more opportune. The larger companies are merely selected based on added value to realize innovation agendas, valorization projects agreed within SIGs.

#### **5. Expand number of projects in which the i3B Foundation is financed**

In the past, i3B performed mainly matchmaking for participants to join (EU) project consortia. The i3B foundation was first time project partner in 2016 to connect the i3B ICT network with Health and Food innovation networks (C.I.A.L.E. project). Benefits of being a project partner are amongst others; recognition, promotion, influence on innovation agendas, realizing cross-overs and herewith strengthening the network and multiplying the financial means contributed by participants.

In 2017, we were able to submit a Science and Technology network (COST) application on ICT and Food and were dissemination partner in a Horizon 2020 MIND project. The role of i3B in these projects was setting an innovation agenda, business modelling and dissemination. We prepared in 2017 also an overview of i3B services in this respect. In the beginning of 2018 i3B also submitted two EFRO cluster and network applications with i3B as main partner. i3B will keep executing matchmaking for projects initiated by other parties. i3B strives to get a limited role in these projects.

## **6. Look for cross over collaboration with other innovation networks**

i3B participates in other innovation networks '*with closed wallets*'. i3B worked together with other innovation networks in projects to realize cross-overs. i3B would like to expand this type of project collaboration. Last but not least we will also investigate even closer types of collaboration with other networks. These activities should lead that i3B forms a more and more successful innovation system with societal and business impact on monitoring Healthy Lifestyle, Animal Monitoring and Human Factors.

## CHAPTER 2

# ECOSYSTEM

The diagram below is a schematic representation of the i3B model of collaboration of knowledge institutes, high-tech companies and end users. The collaboration is aimed at joint research, development and commercialization. The i3B network can utilize (field) lab facilities to exchange ideas, develop prototypes, test and finally introduce to the world innovative ICT solutions for brain, body and behavior.

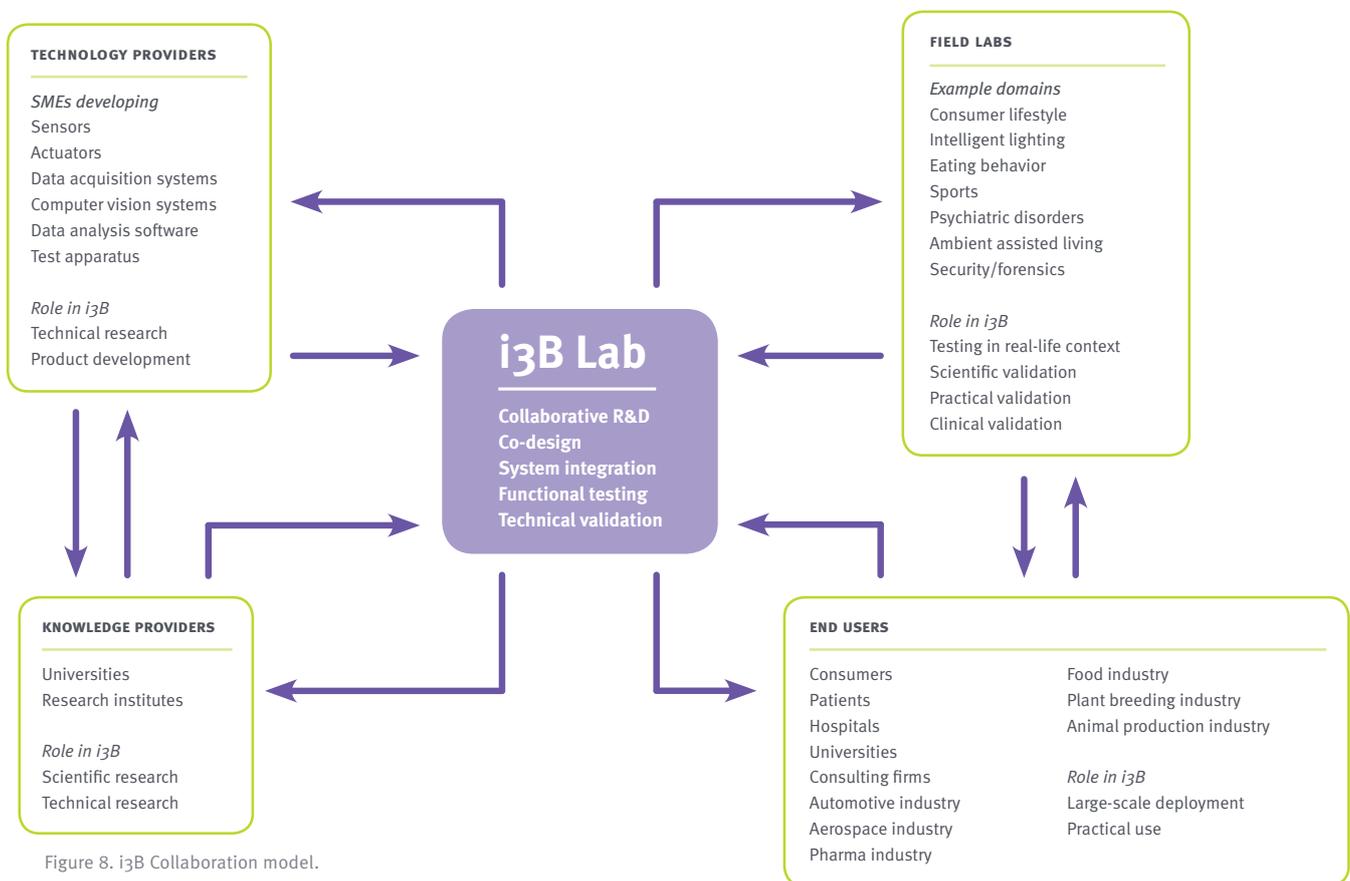


Figure 8. i3B Collaboration model.

## 2.1 Companies

Technology providers (i.e. businesses) are the participating high-tech companies that develop ICT tools (hardware or software, components or systems) with which specific brain, body and behavior aspects can be measured and analyzed. The design of these tools is based on the knowledge produced by the knowledge providers. An overview of all participating technology providers in 2017 is given below. In paragraph 3.7 we will elaborate on the growth of the i3B network in 2017.

**Noldus**  
Information Technology

  
**bereslim.nl**

**artinis**  
medical systems

 **Motek**

  
**Eagle Vision**

 **ant**neuro  
inspiring technology

  
**SMART EYE**<sup>®</sup>

  
**MINDMEDIA**  
NEURO AND BIOFEEDBACK SYSTEMS

 **ELITAC**  
INFORMATION YOU CAN FEEL

 **VICAR VISION**

**DORSET I D**  
IDENTIFICATION

  
**NEURO DEVICE**

  
**TMSi**

 **noviosys**  
MAPS GROUP



 **sensehealth**

  
**OpenUp**  
Technologies

MacTechCity

  
CORTICAL STUDIOS

 **PACTIVE MOTION**

**VR LAB**

**nechi group**

  
**ADVANTIS**  
MEDICAL IMAGING

**FarmResult**<sup>®</sup>  
managementsystems  


**SODAQ**

**ICR3ATE**  
digital • makers • lab

**EAGLE** | software  
SCIENCE | innovation  
application

**THALES**

 **orikami**  
personalized healthcare

Figure 9. i3B Participants in 2017.

## 2.2 Knowledge providers

Research at universities and institutes (knowledge providers) from different disciplines results in scientific knowledge about brain, cognition, physiology, and behavior, the measurements needed for this and the desired read-out parameters. The knowledge institutes in the i3B network also provide the latest knowledge in sensor technology, computer vision, artificial intelligence, Internet of Things and Big Data analysis. In paragraph 3.7 we will elaborate on the growth of the i3B network in 2017.



Figure 10. i3B Knowledge providers in 2017.

## 2.3 End users

i3B collaborates closely with end users to develop innovative ICT solutions. Eventually, i3B tools are sold to consumers, hospitals, universities, and companies.

## 2.4 Network and sector organizations, alliances

This category comprises network organizations, platforms and associations that collaborate with i3B to strengthen the innovation capacity in the domains of Food, Health, Mobility and Security.



## 2.5 i3B Lab

In the i3B Lab the prototypes of the technology providers are tested in relevant but small-scale lab environments with representative test subjects. The prototypes are technically validated, debugged and iteratively improved. As soon as they are robust enough they are offered to the next link in the chain: field labs.

## 2.6 Field labs

Field labs are controlled environments, modelled after the real world. In these domain-specific research facilities, the i3B tools are validated in field tests, clinical studies and valorization with end users before they are launched commercially. The labs can either be linked to i3B (such as the Restaurant of the Future for food choice and eating behavior), or they can be independent, such as the Philips Experience Lab for consumer lifestyle, and Sportinnovator Centre Papendal.

## CHAPTER 3

# ACTIVITIES

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The i3B Foundation has undertaken a range of activities for the benefit of participants and end users in 2017. A non-exhaustive overview of activities is given below.

### 3.1 Connect

The i3B network connected science and businesses to exchanges ideas, knowledge and trends. In 2017, the decision has been made to focus on healthy lifestyle, monitoring animals and human factors in dedicated small groups (SIGs). The SIG establishes a joint agenda and will execute the agenda in joint projects.

#### Agendas

A Healthy Lifestyle agenda was published in 2017 together with innovation networks Health Valley NL and Food Valley NL. Thanks to this collaboration i3B forms the largest SME network in the East of the Netherlands. i3B prepared also an agenda (white paper) on Human Factors, coordinated by Thales Netherlands and realized in the newly established SIG Human Factors, to be published beginning of 2018. A SIG Animal Monitoring was also launched in 2017. i3B submitted in this respect beginning of 2018 the EFRO cluster and network application 'x3D' which will allow to make a joint innovation agenda on Animal Monitoring if successful. Also an EFRO cluster and network application on Food & Cognition, which would be complementary to the Healthy Lifestyle innovation agenda.

#### Events

i3B organized more than the 10 anticipated 'Connect' events: Neurovation, co-organized with the Donders Institute was by far the most successful annual event in our five year history with over 150 participants, and strengthening the i3B brand awareness. An overview of i3B Connect activities in 2017, in chronological order:

#### — 12 January 2017 – i3B meets MARIN matchmaking event

This 'i3B meets' event took place at the MARIN head office in Wageningen. The event kicked off with an informal lunch, followed by a MARIN introduction by Bas Buchner (MARIN's Managing Director) and Wendie Uitterhoeve (Project Manager Human Factors). Subsequently, i3B participants Noldus IT, Thales, NLR, EagleScience, Flavour and

ICR3ATE presented a pitch, explaining their (technical) solutions to the ambitions and challenges of MARIN in the field of Human Factors. Result of this event is the establishment of a Special Interest Group in the area of Human Factors.



Figure 11. MARIN simulator.



Figure 12. i3B meets MARIN event.

#### 6 February 2017 – DSM Food Specialties top visits i3B

On the 6<sup>th</sup> of February 2017, 50 senior scientists and executives from DSM Food Specialties visited the i3B headquarters in Wageningen. The focus of this visit was consumer behavior, therefore the guests were treated to interactive demonstrations of the User Experience Lab and the Virtual Shop.

#### 14 February 2017 – Neurotech NL matchmaking event

i3B attended this matchmaking event to represent the i3B network in the Neurotech NL field. This event focused on new methods to control aberrant brain activity to improve the condition of patients with epilepsy, Parkinson's disease and psychiatric diseases.

#### 9 March 2017 – Health Valley Event

The Annual Health Valley Event took place in Cinemec Nijmegen, and was a great success. The central theme was: *'Patient driven innovation'*, with a program filled with key note speakers, workshops, matchmaking, an investors lounge and lots of opportunities to network. i3B contributed to this event with a C.I.A.L.E. stand in the *'Living Lab'* exhibition area.

#### 6 April 2017 – C.I.A.L.E. Healthy Lifestyle matchmaking event

The C.I.A.L.E. partners i3B, Health Valley NL and Food Valley NL organized a Healthy Lifestyle matchmaking event on the 6<sup>th</sup> of April, 2017 at the Noviotech Campus in Nijmegen. After an introduction of the C.I.A.L.E. project by i3B Managing Director Simon Haafs, thirteen project pitches with many possibilities for collaboration took place. Subsequently, several professionals provided a pitch in which they discussed the questions: Who am I?, What am I looking for? and How can we help each other? With more than 20 pitches and over 85 registered participants, we remember the Healthy Lifestyle matchmaking event as a great success. Impression video of the Healthy Lifestyle matchmaking event: <https://youtu.be/POYeniAYc8o>



Figure 13. C.I.A.L.E. Healthy Lifestyle matchmaking event Nijmegen.

7 April 2017 – Special Interest Group Human Factors meeting

The first meeting of the SIG Human Factors took place at the MARIN office. Goal of this first meeting was to determine the common ambitions, agenda and composition of the SIG Human Factors.

19 April 2017 – Workshop ZGV  
‘Monitoring breast cancer patients’

i3B organized a workshop in collaboration with the Gelderse Vallei Hospital – Nutrition and Health Care Alliance, Wageningen University & Research and lean innovation agency DOON. Goal of this workshop was to tackle the challenge: how to improve the quality of life and well-being of breast cancer patients, during and after treatment, with e-coaching solutions. DOON coaches guided every team in this process, based on techniques such as Design Thinking and Lean Innovation Tools. Every team created a shared ‘Value proposition’ and identified the pains, gains and jobs to be done of the ‘user’ of the solution; the breast cancer patient. Last but not least, every team pitched their solution, based on Value Proposition Canvas.



Figure 14. Value Proposition Canvas at the i3B workshop.

13 June 2017 – i3B meets WUR ASG match-making event

i3B and Wageningen UR Animal Sciences Group organized a matchmaking event on the 13<sup>th</sup> of June, 2017. The participants of the event were inspired towards collaboration by five WUR ASG project idea pitches with possibilities for companies to join a consortium. After a short break, technology solutions to monitor animal health were presented by attending participants.



Figure 15. i3B meets WUR ASG event.

14-15 June 2017 – IJDS Symposium

The International Journal of Driving Science (IJDS) organized the 1<sup>st</sup> IJDS symposium in Haarlem, The Netherlands. In this symposium, intelligent vehicle technologies integrated with human factors in applied research. Here, researchers and engineers from academia, industry and government met and presented their latest findings and state-of-the-art technology. The workshop focused on the following themes: Driver Vehicle Interaction, Interaction between the Driver and Accident Avoidance Technologies and Driver Vehicle Adaptation.



Figure 16. IJDS symposium leaflet.

— **15 June 2017 – Health, Food & Technology event Zeist**

i3B attended this event with a C.I.A.L.E. stand, in order to collect ideas for ‘*Win a coach*’ and to spread the word on the C.I.A.L.E. project. Interesting connections have been made, which will be explored in the future, such as Nutriprofiel (food advice based on food surveys combined with blood research).

— **7 July 2017 – SIG Animal Monitoring meeting**

The first meeting of the SIG Animal Monitoring took place at the Zodiac building at the WUR campus. Goal of this first meeting was to determine the common ambitions, agenda and composition of the SIG Animal Monitoring.

— **21 August 2017 – IPC meeting**

This meeting was a preparation for an IPC subsidy application on animal monitoring. Part of the consortium of the previous IPC application (i3B-Linx) and other i3B participants joined this exploratory meeting.

— **11 September 2017 – i3B Special Interest Group Human Factors meeting**

At this second meeting of the SIG Human Factors, the SIG’s goals, ambitions and application domains have been discussed. Now, five SIG members (Kees Nieuwenhuis, Jan van Erp, Rolf Zon, Peter Renden and Colin Guiking) will work on a white paper, in which the SIGs goals and ambitions will be set.

— **22 September 2017 – i3B Board & Supervisory board Brainstorm workshop**

On 22 September 2017, i3B organized a workshop for the i3B Board, i3B Supervisory Board and the directors of innovation networks TI Coast, Food Valley NL and EIT Digital. Goal of this workshop was to brainstorm about the i3B business model of the future, from different perspectives towards a conjoint business model. The day kicked off with presentations by the directors of the invited network organizations, followed by a Lego Serious Play® workshop towards a Business Canvas under the guidance of Hugo Bakkenist, DOON. The outcomes of this workshop will be guidelines for the i3B Work Plan 2018.



Figure 17. i3B Brainstorm workshop with i3B board and Board of Supervisors.

— **25 October 2017 – Success in Europe – Concepts for Healthy Life meeting**

i3B attended this event to represent the i3B network in the field of Healthy Lifestyle and to stay up-to-date from the latest innovations in this area.

— **12-13 October 2017 – Workshop ‘Better analysis with fewer animals’**

This 2-day workshop took place with the goal to stimulate the collaboration between neuroscientists and computer scientists for the development of computational methods such as automated measuring tools for animal behavior. Specifically, the aim was to bring the two fields closer together by increasing the understanding of each other’s challenges and requirements.

— **2 November 2017 – C.I.A.L.E. Win a Coach day**

The C.I.A.L.E. partners organized a day program to accelerate submitted ideas with several workshops, in order to state trends, vision, mission, a value proposition and a pitch. At the end of the day, the participants pitched their idea for a jury, who selected two out of the eight ideas for continuation of the guidance process. The two winners of personal DOON Innovation Coaching are Bereslim and Biovolt, the other six participants will receive guidance from the C.I.A.L.E. partners as well, such as connections with possible partners.



Figure 18. C.I.A.L.E. Win a Coach day program.

— **14 November 2017 – Japanese IFIT-ILP visits i3B participants**

On 14 November 2017, a delegation of the Japanese International Foundation for Information Technology (IFIT) - in particular the Innovation Leaders Program (ILP) group - visited i3B participants Wageningen UR, Noldus IT and FarmResult. The IFIT-ILP delegation visited Wageningen for inspiration from frontier technology companies in the area of Big Data/Artificial Intelligence applications in Agriculture. Among the IFIT visitors is the Chief Information Officer of the Japanese Government, who is currently developing a digital platform for Agriculture in Japan.



### 24 November 2017 – Neurovation event

This networking event was organized by i3B and the Donders Institute to create neuroscience-driven solutions for current and future societal issues. The event kicked off with a plenary morning session, with presentations by (amongst others) Dr. Nicky Hekster from IBM and Dr. Boris Konrad (Memory Champion). Subsequently, the event split in five break-out sessions. The *‘Healthy Lifestyle & Behavioral change’* session was organized by i3B, with many interesting pitches from attendants (i3B participants, Donders Institute researchers and foreign entrepreneurs) on Healthy Lifestyle and Behavioral Change. Besides, five i3B participants set up a demonstration booth at the Neurovation event, in order to show their innovative solutions to the attendants of the event. The Scientific Advisory Board (SAB) was invited for the Neurovation event to take part in matchmaking sessions.



Figure 19. Donders Neurovation event in Nijmegen.

### 14 December 2017 – EIT Living Labs event

i3B attended this event, organized by EIT in Rotterdam. Several pitches from a variety of EIT living labs from Belgium and the Netherlands took place, as well as pitches from SME's and start-ups. A number of interesting contacts have been made, which will be explored towards collaboration in 2018.

## 3.2 Innovate

Participants become partners in national or European project consortia with financial support from programs such as Horizon 2020, TKI and INTERREG. In these projects, i3B Foundation is a partner, or at least two i3B participants are part of the consortium. i3B delivers the following services in projects:

1. **Partner search.** National and international partner search to complete your R&D consortium.
2. **Consortium building.** Align the visions of knowledge and business partners on the scope of an R&D proposal.

Examples are the *‘IPC’* subsidy application where 20 SMEs of i3B collaborate to develop innovative ICT solutions to monitor brain, body and behavior. Furthermore in an EU funded project C.I.A.L.E. where the full i3B ICT cluster is connected with a Food and Health innovation network to realize cross overs related to healthy lifestyle.

3. **Dissemination.** i3B can write the dissemination plan for an R&D proposal and can carry out dissemination activities in a project: organize workshops and events, write newsletters and spread results through channels like social media.
4. **Valorization and business modelling.** i3B assists with finding new business models for the valorization of scientific knowledge. A typical example is a European Cooperation in Science and Technology (COST) networking grant recently submitted on ICT and Food.
5. **Other services upon request.**

The goal in 2017 was to submit 10 R&D project proposals with a minimum of two i3B participants or the i3B Foundation as partner. In 2017, i3B submitted 13 project proposals of which 8 were successful, 3 projects are still under review and 2 proposals were rejected. 15 projects from 2016 are ongoing in 2017: C.I.A.L.E., Phenolab, Personalized Nutrition & Health, BriteN, SenSuit, NeuroCIMT, Personalized Nutrition & Health in China, Brainwave, VetBioNet, Daisy2, GenTORE, Virtual Emotion Reader, NESTOR, Combine and Prautocol.

Hereunder, we made a selection of i3B projects in the categories: successful (approved), under review, rejected and finalized.

### Successful applications

#### Belt for visually impaired persons project

The partners of the ZonMW/STW/Interreg project ‘Belt for visually impaired persons’ developed a system to assist visually impaired people in recognizing facial expressions from others. This system consists of a camera attached to a smartphone, corresponding facial



Figure 20. Belt for visually impaired people.

expressions of the conversation partner to a vibrating belt which translates the facial expressions to a certain vibration. In this way, visually impaired people can tell from the vibration if and how someone is looking at them.



#### DriveLab for Health project

Noldus Information Technology have been successful in getting a €46k grant for further development of their DriveLab solution. DriveLab is an integrated setup for measuring the behavior of someone using a driving simulator and was initially developed in a previous project together with a number of i3B partners including the HAN University of

Applied Sciences. The grant is funded by the ACTTiVate project. This EU project aims to foster cross-sectorial innovation in SMEs to create new services and products.

DriveLab was originally created for human factors research and in this project it will be further developed with particular attention to the possibilities for research into the impact of diseases and ageing on driving ability.



### **Sensing alarm responses of ungulate herds to prevent poaching of endangered megafauna**

Wildlife crime is an important driver of biodiversity loss and disrupts the social and economic activities of local communities. During the last decennium, elephant and rhino poaching has increased strongly. Internationally, innovative, high tech solutions are sought after to tackle wildlife crime, such as wireless sensor networks attached to animals. Miniaturization and low-cost production of sensors have increased the possibilities to measure multiple animals (i.e. herds) at the same time. Incorporating data about within-herd spatial position, group size or group composition will improve the successful detection of poachers. The objective is to develop a wireless network of multiple sensors for sensing alarm responses of ungulate herds to prevent poaching of rhinos and elephants.



Figure 21. Cow herd.



### **ICT with Industry 2017 – Eagle Vision Case**

In the ICT with Industry workshop, during five days approximately fifty researchers from Information Technology and Computer Science from a wide range of universities within the Netherlands and Europe worked together extensively on challenging problems proposed by industrial partners. The workshop brought together scientists and professionals from industry and governments.

i3B attended this workshop with the Eagle Vision case: *Deep learning for visual verification*. Current deep learning methods focus on object recognition, which detects the presence of existing objects. Instead, here, we already knew the object that would be present, yet we wanted to verify their quality. We brainstormed about the scientific state-of-the-art in deep learning and practically explored existing deep-learning frameworks. Eagle Vision offered high-performance computing resources (GPUs in the cloud) and data for this project, besides their expertise.

## EQIPD

The European Quality In Preclinical Data (EQIPD) project aims to dramatically increase the quality of data collected in pre-clinical studies. Findings from laboratory research often do not translate to success in human studies. Even when the same experiment is carried out in multiple labs, findings from one lab cannot always be replicated in others. It is often not clear if this is because of as yet undiscovered biological factors, or because of unwanted differences in how the experiments were done. This project defines quality standards such as being able to demonstrate that studies were randomized and blinded, supported by an adequate sample size calculation and that the hypothesis being addressed has been described in advance which will lead to a great increase in the quality and robustness of research.



## Citius, Altius, Sanius

The prevailing lifestyle in the Western world (immobility, stress, unhealthy diet, smoking and drinking habits) is an important factor in the etiology of many chronic diseases. Physical activity and exercise through sport participation can help to reduce this risk factor, but introduces new risk factors associated with exercise related injuries.

The aim of the program '*Citius, Altius, Sanius*' is to stimulate people to participate in sports, physical activity and fitness by providing motivational cues about their performance, using advanced sensors and data science. Simultaneously, individual and generic information will be provided to the physically active in order to reduce the risk of injury and overloading.



## GenTORE: Breeding livestock for resilience and efficiency

This approved project (Horizon 2020) is all about increasing the resilience of cattle to an increasingly changing environment. With a combination of more extreme weather events caused by global warming and a historical focus on breeding mostly to increase production efficiency, it is critical that cattle breeders have the tools to be able to also breed for resilience.



Precision livestock phenotyping is a critical element in developing such tools. We need to be able to efficiently measure various aspects of cows' health, welfare and behaviors in a variety of circumstances, both indoors in an intensive form in the cow barn and outdoors with extensive grazing in the fields.

### Quantified Consumer

In a recent study, the TNO-Unilever-Eaglescience team successfully demonstrated for the first time that it is possible to estimate experienced emotion during real-life cooking and tasting using implicit neurophysiological measures such as ambulatory EEG and EDA (skin conductance) measures. The consortium used large differences in food stimuli: two stir-fry dishes that were a priori expected to evoke different affective reactions, i.e. a pleasant dish with chicken and an unpleasant dish with mealworms as main ingredients. In the project *'The Quantified Consumer'* we will extend the research to subtle food stimuli and will add information about behavior (movement) to provide context information to improve the interpretation of neurophysiological information and as a source of information in itself. The consortium will examine a cooking process that is more self-paced (not timed as in the previous experiment) to deliver new insights on more subtle emotions and will develop an unique measurement tool that supports the identification of emotions in preparation and consumption of foods over time.



### Applications under review

The following project applications were submitted in 2017 and beginning of 2018:

#### Smart@Foodie

In September 2017, the European Science and Technology (COST) application *'Smart@Foodie'* has been submitted. Diet related non communicable chronic diseases (NCDs e.g., obesity, cardiovascular disease) as well as unsustainable food practices is a societal challenge. This COST Action will meet the challenge of achieving a high level of coordination at the interface between *'digital'* and *'food'*. i3B will take the lead in a work package on business modelling. In February 2018, we expect the result on this application.

#### X3D

i3B, Wageningen Livestock Research, the Van Hall Larenstein University of Applied Sciences, Saxion University of Applied Sciences, the University of Twente and DOON Cooperative have joined forces in the x3D EFRO cluster and network reinforcement project. x3D stands for information, communication and sensor technology (ics, pronounced x) monitoring animal behavior, animal health and animal welfare (3D).



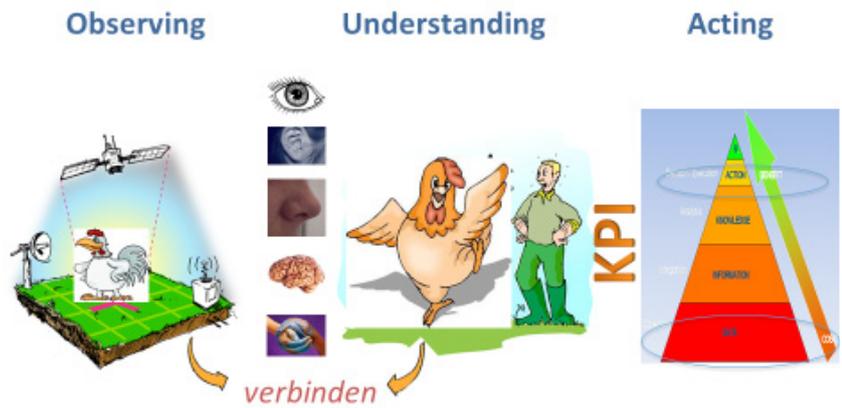


Figure 22. Monitoring chicken.

The x3D project initiates, promotes and strengthens cooperation between (SME) business, knowledge institutions and end users. This leads to x3D innovations, resulting in a contribution to the economic and social development of the East Netherlands region. Project activities consist of connecting stakeholders through a joint roadmap, organizing inspiration and matchmaking meetings, developing valorization and collaboration projects, coaching in groups of SME entrepreneurs, and finally the promotion of the x3D cluster.

### Food & Cognition

i3B, Wageningen University, Radboud University, Noldus IT and the Noaber foundation joined forces in the Food & Cognition EFRO cluster and network reinforcement project. Understanding eating behavior in relation with the brain. Designing technology to give personalized targeted eating advice. The activities consist of building an innovation roadmap with public and private commitments and positioning the roadmap nationally and in Europe.

Societal challenges

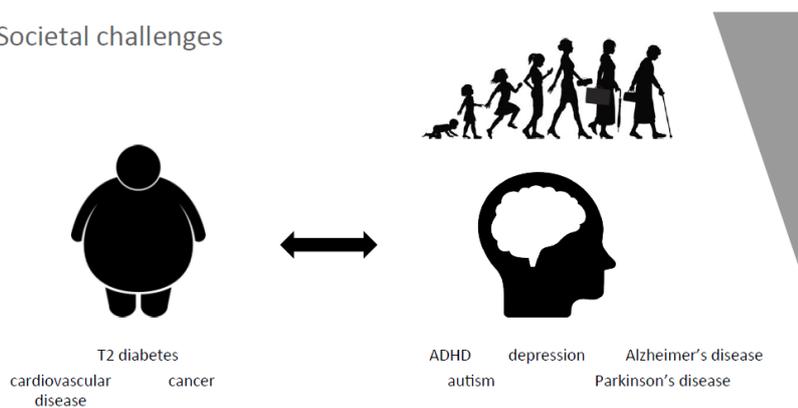


Figure 23. Societal challenges on Food & Cognition.

### Rejected proposals in 2017

Not every (re)submitted project proposal was successful. In 2017, 2 applications were rejected. Some of the proposals have been, or will be resubmitted. The rejected projects are listed on the next page:

## MIND

Childhood obesity is caused by cultural, environmental, interpersonal, psychological, behavioral and biological/neural factors, which have often been studied in isolation. The goal of MIND is to further study these factors in detail, and how they interact and jointly determine childhood obesity, by employing an innovative network approach. The MIND consortium consists of world renowned experts in their fields, bringing together necessary knowledge from diverse disciplines (neuroscience, psychology, physical activity, human biology, gut-brain signaling, data science, information technology, preventive medicine, epidemiology, genetics, nutrition and urban design). In MIND, researchers will collaborate with industry (Sense Labs and Flavour), society, policy makers and market actors. This is a second stage application. i3B has been assigned as dissemination partner in this project. This will ensure that science will find its way to society and the market.



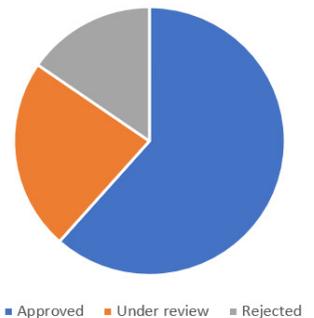
## ABC Toolbox

In 2017, the ABC Toolbox application, towards developing a measuring behavior toolbox for infants, has been resubmitted at the STW perspectief for the 2nd time. The consortium consists of (amongst others) Radboud University, Artinis, TMSi, ANT Neuro and Noldus IT. The consortium will resubmit.



## Finalized project in 2017

No projects have been finalized in 2017. The goal in 2017 was to have 10 projects submitted. i3B achieved this ambition: i3B submitted 13 project proposals in 2017, from which 8 were approved, 3 are still under review and 2 have been rejected. A schematic representation is presented in figure 24.



■ Approved ■ Under review ■ Rejected  
Figure 24. Pie chart of submitted i3B projects in 2017.

### 3.3 Accelerate business

i3B participants develop new ICT products for Brain, Body and Behavior. Typical R&D project results are products like DriveLab. i3B promotes these products through conferences and matchmaking events. To accelerate business, i3B attends, presents or shares a booth with i3B participants at several conferences. The ambition for 2017 was to organize 2 matchmaking events and presence at 3 conferences. Furthermore, a business council follow up (now called SIG) was planned in work plan 2017.

These ambitions have all been realized in 2017: i3B organized the matchmaking events '*i3B meets WUR ASG*', '*i3B meets MARIN*' and the C.I.A.L.E. matchmaking event in Nijmegen. Besides, i3B attended the conferences: Health Valley event, Health, Food, Technology Zeist and EIT Living Labs. On top, i3B organized several workshops in 2017 such as the C.I.A.L.E. Win a Coach day and the Monitoring Breast Cancer Patients workshop (see 3.1).

### 3.4 Learn, coach

i3B, Health Valley NL and Food Valley NL developed a coaching program on Entrepreneurship for participants. The choice of the entrepreneurship theme stems from the primary need of SMEs to realize additional sales and growth and meet client needs. Entrepreneurship is also a relevant topic for students and researchers in the research institutes from the networks, due to the valorization ambitions. The SMEs learn the most about entrepreneurship from other successful entrepreneurs, who have already made the journey. Entrepreneurs are usually also the most willing to learn from other entrepreneurs. Finally, a relationship of trust is essential to learn, collaborate, share personal and business information in the course. The course strengthens the connection between participants and will further strengthen the collaboration in the other i3B activities like establishing new innovation projects.

In 2017, partners i3B, Food Valley NL and Health Valley NL requested SMEs to send in their innovation idea in the context of Healthy Lifestyle. From the submissions, we selected eight innovation ideas for the next step through coaching by DOON innovation professionals, based on '*Lean Innovation*' tools and techniques. We helped step by step to translate the idea towards a solid value proposition, a first possible business model, and to validate it with the potential target audience.

On 2 November 2017, the C.I.A.L.E. partners organized a day program to accelerate the submitted ideas with several workshops, in order to state trends, vision, mission, a value proposition and a pitch. At the end of the day, the participants pitched their idea for a jury, who selected two out of the eight ideas for continuation of the coaching pro-

cess. The two winners of personal DOON Innovation Coaching are Bereslim and Biovolt, the other six participants will receive guidance from the partners as well, such as connections with possible partners.

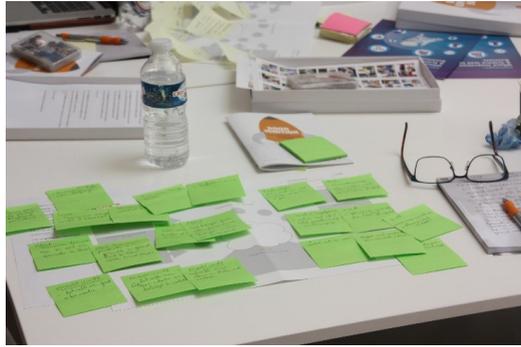


Figure 25. C.I.A.L.E. Win a Coach day, 2 November 2017.

The cluster managers of Health Valley NL and i3B were also trained in these coaching techniques, to retain this knowledge for the networks, and to be able to facilitate these coaching sessions for the networks in the future.

The coaching sessions proved to be successful so far with positive feedback from i3B participants. This is underlined by the fact i3B participants individually hired these innovation coaches as a follow-up on the i3B entrepreneurship program.

### 3.5 Exchange talent

The exchange of human talent like students, researchers, entrepreneurs in the i3B cluster contributes to knowledge transfer, attract and maintain talent for the network and the development of new innovative ICT products. Exchange talent was not a specific priority in 2017. When students for example approached us for an internship, we promoted them in the i3B network. Besides, i3B shared vacancies within the network.

### 3.6 Lab facilities

The i3B network can utilize i3B (field) lab facilities to exchange ideas, develop prototypes, test and finally introduce to the world innovative ICT solutions for Brain, Body and Behavior. In 2017, i3B had one main goal regarding lab facilities: expansion of the CARUS Animal Monitoring lab in Wageningen. With the subsidy application 'x3D' (see 3.2), supported by the i3B SIG Animal Monitoring, i3B was able to set the next step towards achieving this ambition.

### 3.7 Expand network

i3B was continuously able to grow the network and revenues, since the start of the foundation in 2012. The ambitious revenue goal for 2017 was set at €150 000 based on hiring a business developer for 2 days a week. i3B was not able to attract a proper candidate. i3B lowered therefore the revenue ambition for participants to €120 000, which was achieved.

In 2017, a total of 6 new participants joined the i3B network: MARIN, Neuro Device, Bereslim, VR Lab, Orikami and Advantis Medical Imaging. Two knowledge institutions cancelled i3B participation in 2017: HAN and RUN BSI.



Furthermore, i3B hired two project developers. One project development on 'Automatic oestrus detection in sows' was not successful. A full report is available upon request. The results for the other project development, review of the COST subsidy application, are expected February 2018. Thanks to the new SIG model of collaboration, i3B had the first commitment of a large company, Thales, to join the network.

The promotion goals were also achieved; publishing newsletters, regular website updates a price competition, and LinkedIn group updates. We have 39 members in the LinkedIn group. The ambition was however 50 members. i3B also launched an 'introduce a friend' instrument which unfortunately didn't result in new participants.

## CHAPTER 4

# RESULTS

This table summarizes the activities and key performance indicators with the results per 31 December 2017. The key performance indicators from the workplan 2017 are used to evaluate the results. The description of the figure follows below the table.

Ambition	Planned	On schedule	Explanation
<b>Connect</b>	10 Connect meetings: 2 Scientific Advisory Board meetings, 2 Business Councils (SIGs), 4 i3B Cafés, 1 <i>Measuring Behavior</i> business track in Dublin, 1 Participant meeting, and 1 Annual Symposium	✓	<p>i3B (co)-organized more than 13 events. Some highlights: Neurovation, Special Interest Groups meetings, matchmaking event Healthy Lifestyle in Nijmegen.</p> <p>Due to lack of registrations we cancelled a Scientific Advisory Board meeting (SAB) &amp; SAB members were invited to participate at Neurovation</p> <p>EXTRA: i3B published an innovation agenda on Healthy Lifestyle, and prepared a white paper on Human Factors.</p>
<b>Innovate</b>	10 project proposals submitted with a minimum of two i3B participants or i3B Foundation as a partner.	✓	<p>13 submitted</p> <p>EXTRA: 4 submitted with i3B as beneficiary: MIND, COST, 2x EFRO cluster subsidy.</p>
<b>Accelerate business</b>	Two matchmaking events	✓	i3B meets MARIN & i3B meets WUR ASG
	Presence at 3 conferences	✓	HV event, HFT Zeist, EIT event
	SIG (business council) follow up	✓	SIG Animal Monitoring & SIG Human Factors



Realized



Failed

<b>Learn</b>	1 pilot entrepreneurship program	✓	C.I.A.L.E. Win a coach; pre selection of participants & coaching day with 8 entrepreneurs & training of i3B staff.
<b>Expand network</b>	Signed additional participation agreements with a minimum total value of €30 000, including two large (departments of) companies	✓	Ambition adjusted from 150K to 120K because we couldn't find a business developer. The 120K ambition was achieved.
	2 newsletters	✓	
	regular website updates	✓	
	1 publication	✓	
	1 price competition	✓	
	Knowledge institutes participation reviews finalized	✓	
	Introduce a friend instrument	✓	Introduce a friend instrument was launched without result.
	LinkedIn group with 50 members and 24+ posts per year	✗	39 members, 38 posts



## CHAPTER 4

# FINANCE

### Profit and loss statement

<sup>1</sup> Participation fees by companies and knowledge institutes.

<sup>2</sup> Subsidy revenues, project management of R&D projects.

<sup>3</sup> Personnel - director, secretary, marketing (includes freelancers), business developers.

<sup>4</sup> Sales - Symposia visits, stands, gifts for speakers.

<sup>5</sup> Office - accommodation, office supplies.

<sup>6</sup> General - accountant, advice.

	2013	2014	2015	2016	2017
<b>REVENUES</b>					Realization
Participants <sup>1</sup>	74 500	79 500	100 303	92 410	117 613
Subsidy <sup>2</sup>	40 000	0	0	20 326	39 309
<b>Total in euro</b>	<b>114 500</b>	<b>79 750</b>	<b>103 303</b>	<b>112 736</b>	<b>156 922</b>
<b>EXPENSES</b>					
Personnel <sup>3</sup>	78 137	39 340	102 962	105,962	122 490
Sales <sup>4</sup>	2 975	2 764	10 369	9,514	5 836
Office <sup>5</sup>	3 500	5 650	10 641	0	398
General <sup>6</sup>	15 381	13 714	9 113	9,463	22 894
<b>Total in euro</b>	<b>99 993</b>	<b>61 468</b>	<b>133 085</b>	<b>124 939</b>	<b>151 618</b>
<b>Result in euro</b>	<b>14 507</b>	<b>18 282</b>	<b>-32 782</b>	<b>-12 176</b>	<b>5304</b>

### Explanatory notes - Profit and Loss statement table

#### — Financial statements 2013-2016

Financial statement figures based on approved accountants report.

#### — Realization 2017

##### — Revenues

- Participants. The revenue was set for €150 000 for 2017. The ambitious revenue goal was based on hiring a business developer for 2 days a week in 2017. i3B was not able to attract a proper candidate. i3B lowered the revenue ambition to €120 000, which was practically achieved.
- Subsidy. The approved European C.I.A.L.E. subsidy is €92 500 for 2,5 years, started in May 2016. The revenue prognosis for 2017 was €40 000 and realized.

- Expenses
  - In the course of the year, i3B decided to hire two project developers on project basis instead of the business developer on the payroll. The primary goal for the new business developers was to realize projects. The idea was that once a project was successful, new parties would join i3B or pay success fee.
  - Project costs. i3B hired an innovation coach in line with C.I.A.L.E. project plan (10K).
  - i3B hired a consultant to assist with financials (3K), partly also lowering accountant costs (8 to 6.6).
- Result
 

The result is €5 304. i3B invested in two project developers, which needed a lower investment than the anticipated business developer on the payroll. Therefore i3B realized the positive result, instead of the anticipated minus of €7 000.
- Equity
 

€26 924 per 31 December 2017.

## Balance sheet

	2017	2016	2015
<b>CURRENT ASSETS</b>			
<i>Assets</i>			
Debtors	8 510	20 558	7 806
Other receivables and prepayments	21 198	21 213	411
<i>Sum of receivables</i>	<i>29 708</i>	<i>414 771</i>	<i>8 217</i>
<i>Liquid assets</i>	<i>41 645</i>	<i>42 407</i>	<i>77 916</i>
Sum of current assets			
<b>Total assets (in euro)</b>	<b>71 888</b>	<b>84 862</b>	<b>86 133</b>
<b>CAPITAL</b>			
Foundation capital beginning of year	21 620	33 796	66 578
Annual result	5 304	-12 176	-32 782
<b>Foundation capital end of year</b>	<b>26 924</b>	<b>21 620</b>	<b>33 796</b>
<b>CURRENT LIABILITIES</b>			
Debts to suppliers and trade credits	3 213	1 294	3 134
Tax and social insurances	5 750	17 739	17 590
Other debts and accrued liabilities	36 001	44 209	30 348
<b>Sum of current liabilities</b>	<b>44 964</b>	<b>63 242</b>	<b>51 072</b>
<b>Total liabilities (in euro)</b>	<b>71 888</b>	<b>84 862</b>	<b>84 868</b>

## CHAPTER 5

# GOVERNANCE

The i3B governance is shown in the organogram below. The green blocks at the bottom are the six activity lines.

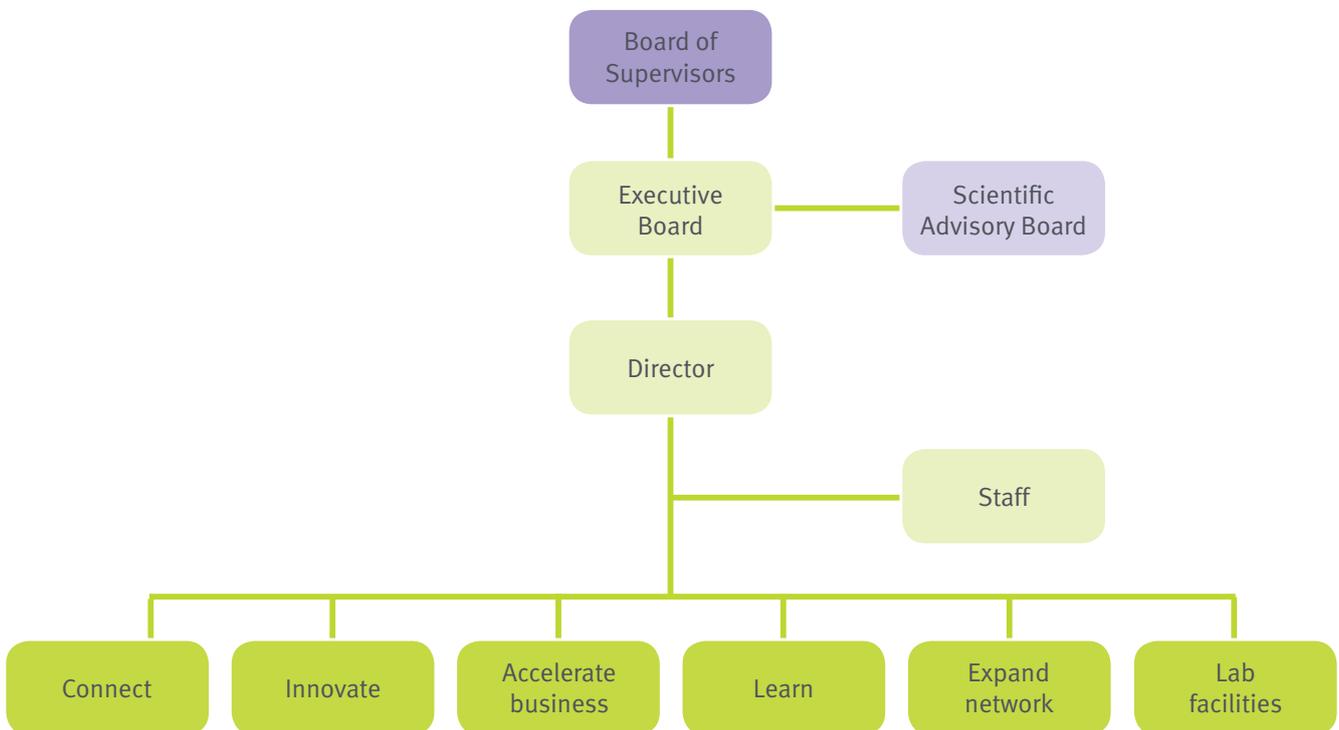


Figure 26. Organogram

### Staff

Simon Haafs, *Managing Director*

Jan-Pieter Meijering, *Communications Associate*

### Executive Board

Lucas Noldus, Noldus Information Technology, *chairman*

Ron van Rossum, Amsterdam Economic Board & Stichting Kinderpostzegels, *treasurer*

Jan van Erp, TNO, *secretary*

Marc Grootjen, EagleScience, *member*

Nico Delleman, Orange Sports Forum, *member*

### **Board of Supervisors**

Leon Kenemans, University Utrecht, *chairman*

Menno van Manen, Wageningen UR, *member*

Hans Abbink, Almende BV, *member*

Rob Heinsbroek, National Initiative Brain & Cognition, *member*

### **Scientific Advisory Board**

Richard van Wezel, Donders Institute for Brain, Cognition and Behavior, *chairman*

Egon van den Broek, Utrecht University

Toon Cillessen, Radboud University

Peter Desain, Radboud University

Bert Don, TNO

Vanessa Evers, University of Twente

Rainer Goebel, Maastricht University

Kees de Graaf, Wageningen University

Jaap Harlaar, VU Medical Center

Leo den Hartog, Nutreco

Paul Havinga, University of Twente

Frans van der Helm, Delft University of Technology

Hermie Hermens, Roessingh Research & Development

Dirk Heylen, University Twente

Ralph Jaspers, Radboud University

Mina Johnson, Radboud University

Pieter Jonker, Delft University of Technology

Hans Korteling, TNO

Ben Kröse, University of Amsterdam

John-Jules Meyer, Utrecht University

Kees Nieuwenhuis, Thales Group

John van Opstal, Radboud University

Elke den Ouden, Eindhoven University of Technology

Herbert Prins, Wageningen University

Nick Ramsey, UMC Utrecht

Maarten van Sinderen, University of Twente

Monique Smeets, Unilever Research & Development

Jacques Terken, Eindhoven University of Technology

Jan Theeuwes, VU University Amsterdam

Hans van Trijp, Wageningen University

Peter Veltink, University of Twente

Remco Veltkamp, University Utrecht

Willem Verwey, University of Twente

Carolina de Weerth, Radboud University

Matt Coler, INCAS3

### **Special Interest Group i3D – Animal Monitoring**

Kees Lokhorst, WUR ASG/VHL, *chairman*

Hans Hopster, VHL

Lenny van Erp, HAS

Andrew Spink, Noldus IT

Kathalijne Visser, Aeres

Gerard van Essen, i3B Business Developer

Richard ten Cate, FarmResult

Jouke Kardolus, Oost NL (occasional)

### **Special Interest Group – Human Factors**

Jos van Doorn, MARIN, *chairman*

Jan van Erp, TNO

Marc Grootjen, Eaglescience

Lucas Noldus, Noldus IT

Rolf Zon, NLR

Johan de Heer, Thales

Kees Nieuwenhuis, Thales Netherlands

Leo Hoogendoorn, TMSi

Peter Renden, Haagse Hogeschool

Colin Guiking, MARIN

Merijn Klarenbeek, Elitac

Pieter Miedema, Donders Institute,

Henk Aarts, Universiteit Utrecht

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