Modern, health and sports related, ICT systems have the ability to acquire considerable amounts of real-time data from the human body on a 24/7 basis using technology that recently has become available and affordable. These personalized and context-aware technologies can help to provide new opportunities to improve people’s vitality, prevention, and sports performance. More research is needed and possible because a multi-perspective approach brings new interesting questions.
Scope

In the Quantified Self research program we research the role of personalized and context-aware technologies that help to:

• better understand relations between people’s vitality and their behavioral patterns in daily life (including but not restricted to sports);
• better understand relations between actual (sports) achievements and activity patterns before, during and after being physically active;
• better understand the contextual motives shaping active behavior, conditioned as this is by routines shaped by our social peer group and our physical everyday living environment.

This will not only provide new opportunities to improve people’s vitality, prevention, and sports performance but it will also enable early detection and slow down the impact of possible injuries and onset of (chronic) diseases. This can give people adequate information to gain control over their (potential) disorder and manage their personal health state with much greater effectiveness than previously and at a fraction of the cost of traditional, curative intramural care.

For researchers, policy makers, health professionals, planners and designers these personalized and context-aware technologies deliver real time, individual and big data on correlations between an active lifestyle and health outcomes contextualized for lifestyle groups and living environments. This provides invaluable information to understand these correlations, to develop intervention strategies and to monitor and evaluate their effectiveness to contribute to a more healthy and sustainable society, countering the nowadays health epidemics of our consumer society: obesity, burn-outs and dementia to mention a few.

Vision

The ambition is to establish, together with partners, a Vitality Academy. In this Virtual Research Centre wide ranges of active life style, recreational sports- and vitality related data are collected to:

• Acquire on a 24/7 basis for groups of people requiring/appreciating this;
• Analyze using state-of-the-art data analytics;
• Integrate into a standardized framework;
• Use to design personalized support for sporters, coaches/trainers as well as for researchers, health professionals and designers active in the above fields.

Research challenges

• The acquisition of activity related data from individual people in “everyday life” related to their health and wellbeing.
• The analysis of this data and translation into scientific models that provide insight in the underlying patterns.
• Develop concepts and models establishing the correlations between psychological, social and physical motives and conditions shaping an active lifestyle as well their impact on health outcomes, both physically and mentally
• The design and validation, in context, based upon these models, of new propositions that will improve the health and wellbeing of these people.
Project examples

**Marathon Eindhoven** (partner since 2013)
Analyzing and supporting the behavior before, during and after the event especially for (starting) recreational runners.

**Inspirun**
Personalized coaching for recreational runners based upon individual activity data.

**Nano4Sports, Interreg V**
Use sensor technology to develop smart innovative solutions for better, safer and lifelong sports experiences for all.

**User-Generated Data for Urban planning**
Analyzing physical activity related wearable data for monitoring and intervention in urban areas.

**Bouncers**
The use of social media techniques to analyze and improve physical activity patterns in social groups.

**Philips-TU/e Flagship on Data Science**
Within the flagship the project ‘Data-Driven Value Propositions; Systems supporting customers and coaches’ addresses quantified self in a sports setting.

**Mine Your Own Body Philips**
Psychological effects of the quantified self.

**Labs**

**Genneper Parken (GP) ‘Sports & Vitality district’**: promote physical activity by an interactive route for individual sporting through the GP greenbelt combining park design, intelligent probes and ICT technologies.

**Fieldlab Op Noord: Interactive running and walking path**: the use of led-technology for monitoring and coaching of recreational sports participants in the fieldlab Op Noord in the Eckart area Eindhoven.

**Smartness, Society, Stories**: continuing our work with the New Institute and Gemeente Eindhoven in the neighbourhoods of Woenselse Heide and Temple from 2016, we will explore existing community connectivity, neighbourhood tensions, and role of governance. The project questions how and where smart city initiatives are addressing the role of people, society, and needs in the city.

**Scientific staff involved**

The research program quantified self is also known as the research roadmap human vitality & technology.

**Core team**

**Prof. Aarnout Brombacher** (RP leader)
Vitality & recreational sport, IoT, preventive health care

**Prof. Wijnand IJsselsteijn**
Cognition and affect in human technology interaction

**Prof. Steven Vos**
Designerly solutions for vital people

**Prof. Pieter van Wesemael**
Urban planning and design for healthy cities

**Marieke van Beurden**
Program director human vitality & technology

**Selection of other staff involved**

Scientific staff from 5 departments and more than 13 research groups are involved.

**Prof. Caroline Hummels**
Design and theory for transformative qualities

**Prof. Jan de Jonge**
Work psychology in human performance management

**Prof. Evangelia Demerouti**
Organizational behavior & human decision processes

**Prof. Masi Mohammadi**
Empathic environment

**External cooperation**

Knowledge institutions: Fontys Hogescholen, University of Utrecht and Utrecht Academic Medical center.

Platform Gezond Ontwerp (“Healthy design”), city governments, Cluster Sports & Technology, several fieldlabs, and local football clubs.

**Contact**

Please join our community and feel free to contact us for more information: vitality@tue.nl.
DSC/e research programs

The DSC/e consists of over **thirty research groups**, each of which is working on their own topic and/or technique, across **six involved departments**. This wide distribution of research efforts creates many opportunities for new collaborations. By setting up research programs the DSC/e aims to connect these efforts to initiate and align joint research. The research programs are centered around key topics where there is a strong researcher base, with a high impact in research and society.

The program provides a meeting place for researchers and industry to get together and have discussions, workshops or research meetings. The goal is to let novel ideas emerge and collaborations between researchers and external parties to be started or strengthened. It is also important for researchers to be aware of the current industrial challenges, and for industry to be aware of the state of the art of research. Existing external contacts can easily be shared to further increase external collaboration.

### Running research programs

- **Customer Journey** – Prof Mykola Pechenizkiy  
  *Informed and responsible analytics to understand and improve the customer journey*

- **Health Analytics** - Prof Uzay Kaymak  
  *Improving your health through data analytics*

- **Internet of Things** - Prof Antonio Liotta  
  *Computational intelligence and network science for the Internet of Things*

- **Quantified Self** - Prof Aarnout Brombacher  
  *Human Vitality & Technology*

- **Smart Manufacturing and Maintenance** – Prof Geert-Jan van Houtum  
  *Exploit the full potential of your data to boost manufacturing and maintenance!*

More information regarding the research programs can be found on our website:  
[www.tue.nl/dsce/rp](http://www.tue.nl/dsce/rp)

You can also contact us directly at dsce@tue.nl