

## ID 09. Industrial design

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# Eindhoven designs

volume three



**ID** Industrial Design



**TU/e**

Technische Universiteit  
**Eindhoven**  
University of Technology  
Where innovation starts



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ID'09 Eindhoven Designs/ volume three

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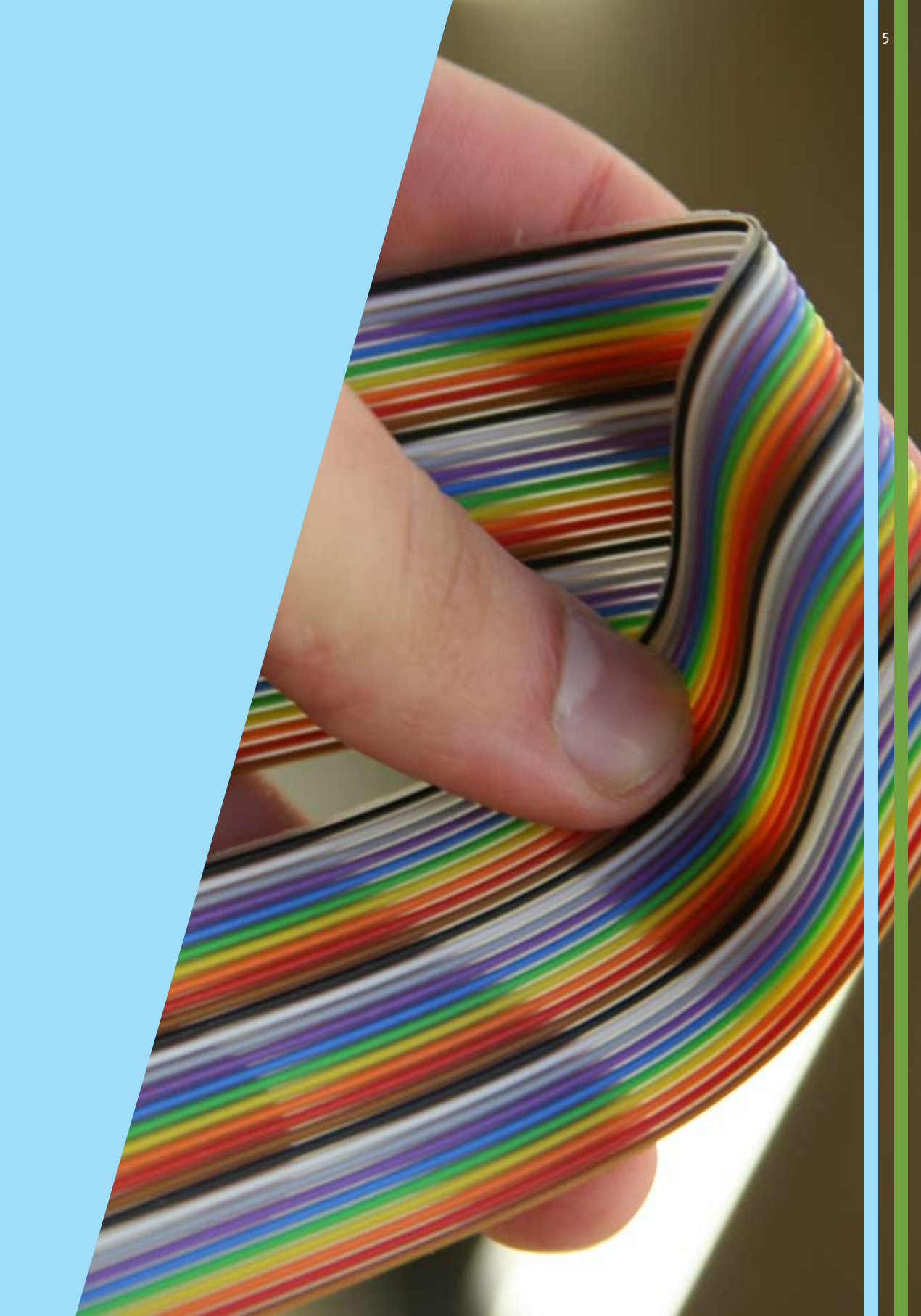
# ID'09 exhibition

**The Board of the Department of Industrial Design at the Eindhoven University of Technology welcomes you to the ID'09 exhibition.**

In 2001, Eindhoven University of Technology (TU/e) started the department of Industrial Design (ID). Now, eight years after ID started, we have more than 500 students, both Bachelor and Master, and around 80 staff members involved in education. It is high time to take a look behind the scenes of ID. ID'09 shows the work of our Master students who recently graduated. Moreover, at this exhibition we show a selection of our regular Bachelor and Master design projects and explain the educational model behind them.

**Welcome to ID'09!**





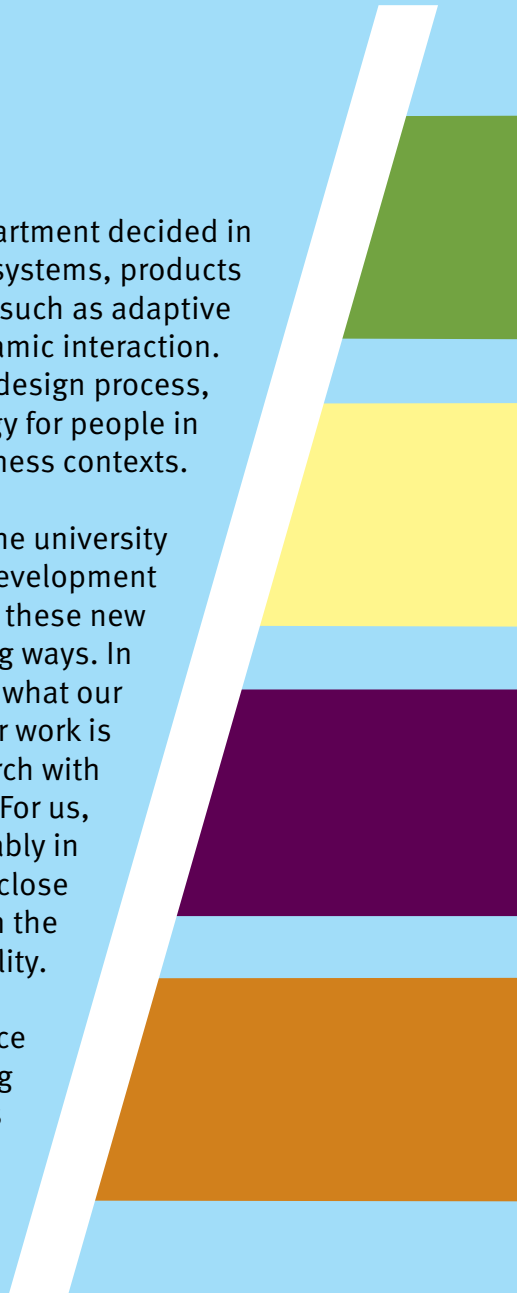


# ID'09 focus:

Based on discussions with industry, the department decided in 2001 to concentrate on the design of intelligent systems, products and related services, which addresses aspects such as adaptive behaviour, context-awareness and highly dynamic interaction. Students learn to integrate various areas into the design process, with emphasis on designs using new technology for people in the socio-cultural and business contexts.

Innovation is of paramount importance to both the university and the department. Because of the rapid development of technology, students learn how to apply these new technologies in innovative and challenging ways. In addition, they are driven by a design vision of what our society may look like in the (near) future, and their work is supported by exploratory studies and solid research with users in the socio-cultural and business context. For us, design is about transforming the world, preferably in beautiful ways, instead of solving problems. Our close relationship with industry gives this design vision the opportunity to become reality.

ID'09 gives all visitors the opportunity to experience this new reality now, through interactive working prototypes. After all, "The proof of the pudding is in the eating".





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# Industrial Design

## in a nutshell

The educational programme of the Department of Industrial Design (ID) at the Eindhoven University of Technology (TU/e) distinguishes itself by its foundational duo of focus, and educational approach, namely:

- **Focus:** intelligent systems, products and related services for social/societal transformation
- **Educational approach:** competency-centred learning

In this chapter we will explain these foundations and elucidate why we consider this duo important for the purpose of educating future designers. In the remaining part of this book we will show these (future) designers and their work and we hope that their visions and designs may inspire you and let you dream about your future.



# 1. Focus: intelligent systems for social/societal transformation

The department concentrates on the design of intelligent systems, products and related services, which addresses aspects such as adaptive behaviour, context-awareness and highly dynamic interaction.

The traditional focus of industrial design on products is moving more and more towards systems. At ID we see systems as adaptive environments in which humans can interact with intelligent products to gain access to services provided. These intelligent products are connected to each other and the surrounding system to achieve a new type of user experience.

Especially the shift towards the complexity of systems and the non-physical aspects of services requires different competencies from designers. Moreover, these competencies will need to develop towards the future since the scope and definition of systems will probably grow over time, including people, organisations, logistics, politics, economics and education.

Being intelligent means that the adaptive behaviour is based on the situation, context of use and users' needs and desires. In particular we focus on opportunities that are of benefit to individuals, societies and different cultures worldwide.

This implies that intelligence incorporates an ethical dimension. However, our contemporary culture has lost a unifying ideology (Branzi, 1989). Therefore, we believe that designers have to not only develop the next generation of digital systems, products and related services with which people can pursue their lives, but also investigate what kind of life and society we (designers, users, industry, society, ...) want these products to support (Hummels, Ross and Overbeeke, 2003). When is it beneficial to us and what makes it so?



Moreover, the complexity of these new systems asks for a new type of designer being on the edge of design, engineering and (social) science (Barneck and Rauterberg, 2007).

These envisioned innovations cannot merely be technology-driven, or based on needs of users in existing product ecologies. As new technology is potentially capable of transforming our world in ways that we cannot know of beforehand, we educate students who are able to apply new technologies in innovative, daring and preferably beautiful ways, driven by a design vision of how our (social) world could be in the (near) future, and based on explorative studies and solid research with users in the social-cultural context (Hummels & Frens, 2008). Moreover, it requires an intense relationship with industry to turn this design vision into reality.

For more information about our focus, see Hummels and Vinke (2009).

## 2. Educational approach: competency-centred learning

During the discussions with industry leaders in the starting period of our department, it became clear that they were interested in hiring academically trained Industrial Design engineers, who are able to lead and work in multi-disciplinary teams, bringing the different perspectives together, and to bridge the worlds of new technological and business strengths on the one hand, and the societal and user desires, needs and opportunities on the other.

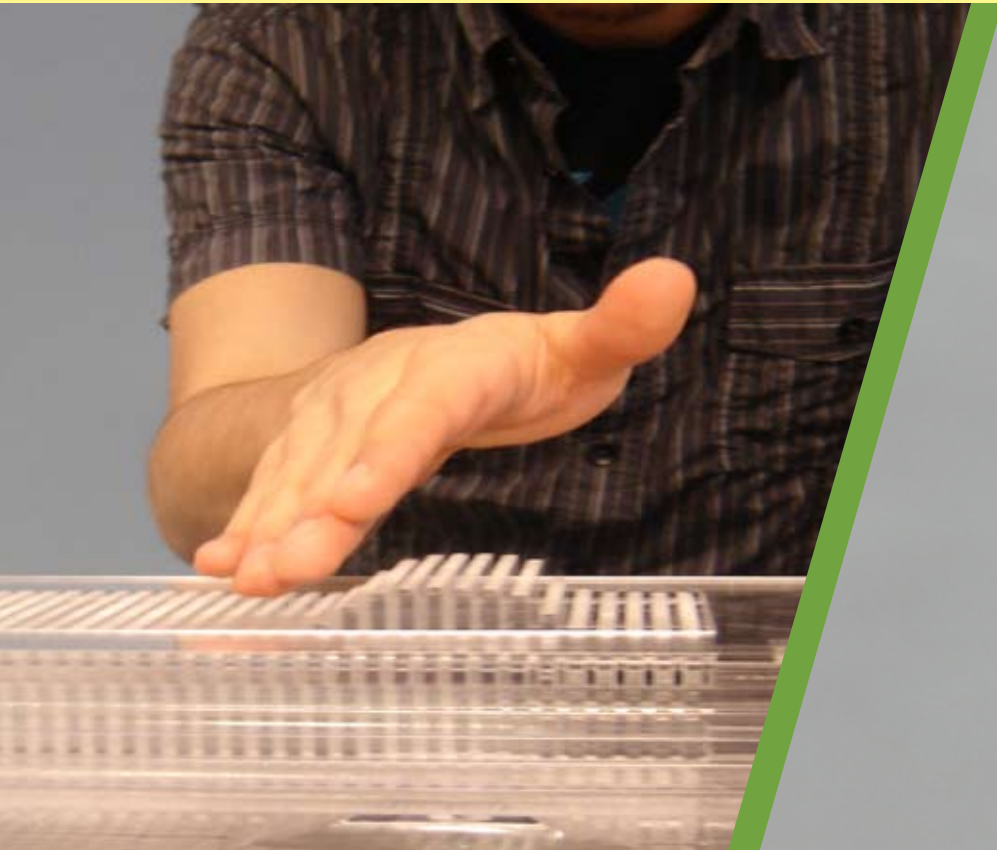
The approach of becoming such an integrator was also scrutinised when looking at the societal developments with respect to learning: present-day society asks for self-directed and life-long learning. Society in the twenty-first century is characterised by rapid changes in various domains, e.g. political, economical, social, aesthetical and ethical. At the same time, science and technology are developing at a very high pace, which is turning this era into a 'knowledge age'. The amount of knowledge is increasing very fast and is expected to go on growing at an even higher pace. Together with the advances in information and communication technology, this increases the volume of easily accessible information beyond imagination.





These societal changes are reflected in the professional workplace. Functioning effectively in this society and the new workplace requires the ability to deal creatively and flexibly with large amounts of constantly evolving information and the ability to learn continuously. Life-long learning, in turn, requires the ability to direct and regulate your learning. In addition, our students need to become experts who are required to work in teams, to cooperate with experts in various fields, and to participate in complex networks of information, resources and instruction. Since the goals of education in the knowledge era have changed, a new perspective for this consistency is needed (Birenbaum, Segers, Dochy and Cascallar, 2003).

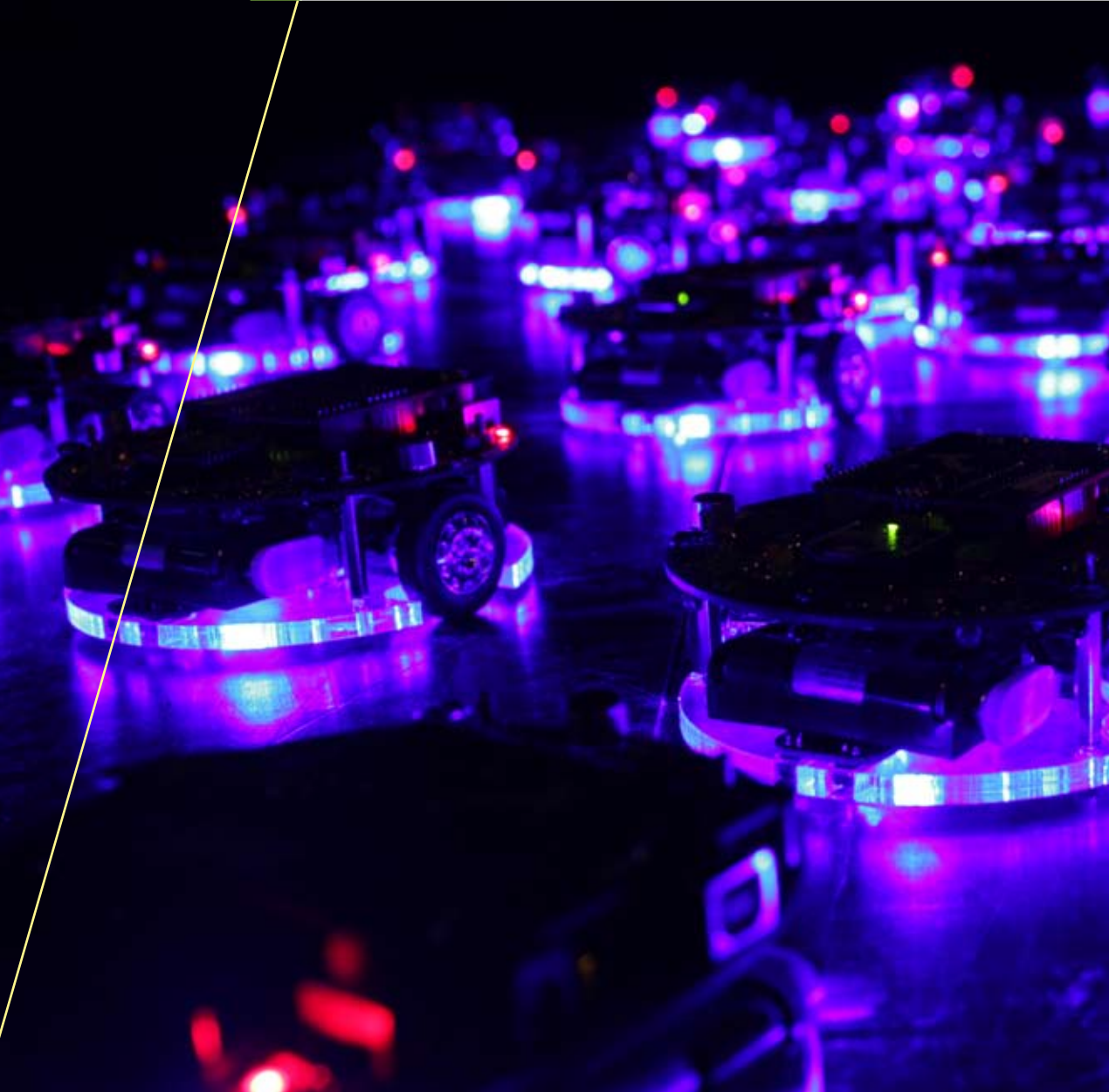
The perspective that ID has chosen is competency-centred learning, an educational model in which learning and working come together. Students learn to learn (what, how and why) and we facilitate their learning in order for them to have the ability to deal creatively and flexibly with the large amounts of constantly evolving information in our 'knowledge era'.



Competency-centred learning offers students the opportunity to give equal weight to knowledge, skills and attitudes, and stimulates them to learn by doing. Within our department, a competency is defined as an individual's ability to select, acquire, and use the knowledge, skills, and attitudes that are required for effective behaviour in a specific professional, social or learning context. Therefore it offers a holistic view of design, where the student develops the overall competence to design by integrating, in our case, ten competency areas related to users, (interaction) design, technology, business, society, modelling, processes, ideation, teamwork and self-directed learning.

The nature of design beautifully intertwines the different types of knowledge with different human skills, in this case cognitive, emotional, perceptual-motor and social. It is about learning and performing through practical application, while simultaneously acquiring theoretical skills. For example, design uses formal scientific notations (based on mathematics) as well as knowledge that is harder to formalise (e.g. aesthetics and creativity). Moreover, knowledge can be obtained through the synthetic skills of the designer (e.g. building physical models) as well as through the analytical skills of the designer (e.g. analysing user behaviour). Reflection in and on action (Schön, 1983) as well as reflection for action are important mechanisms to become aware of what one has learned, and to stimulate and direct this growth.

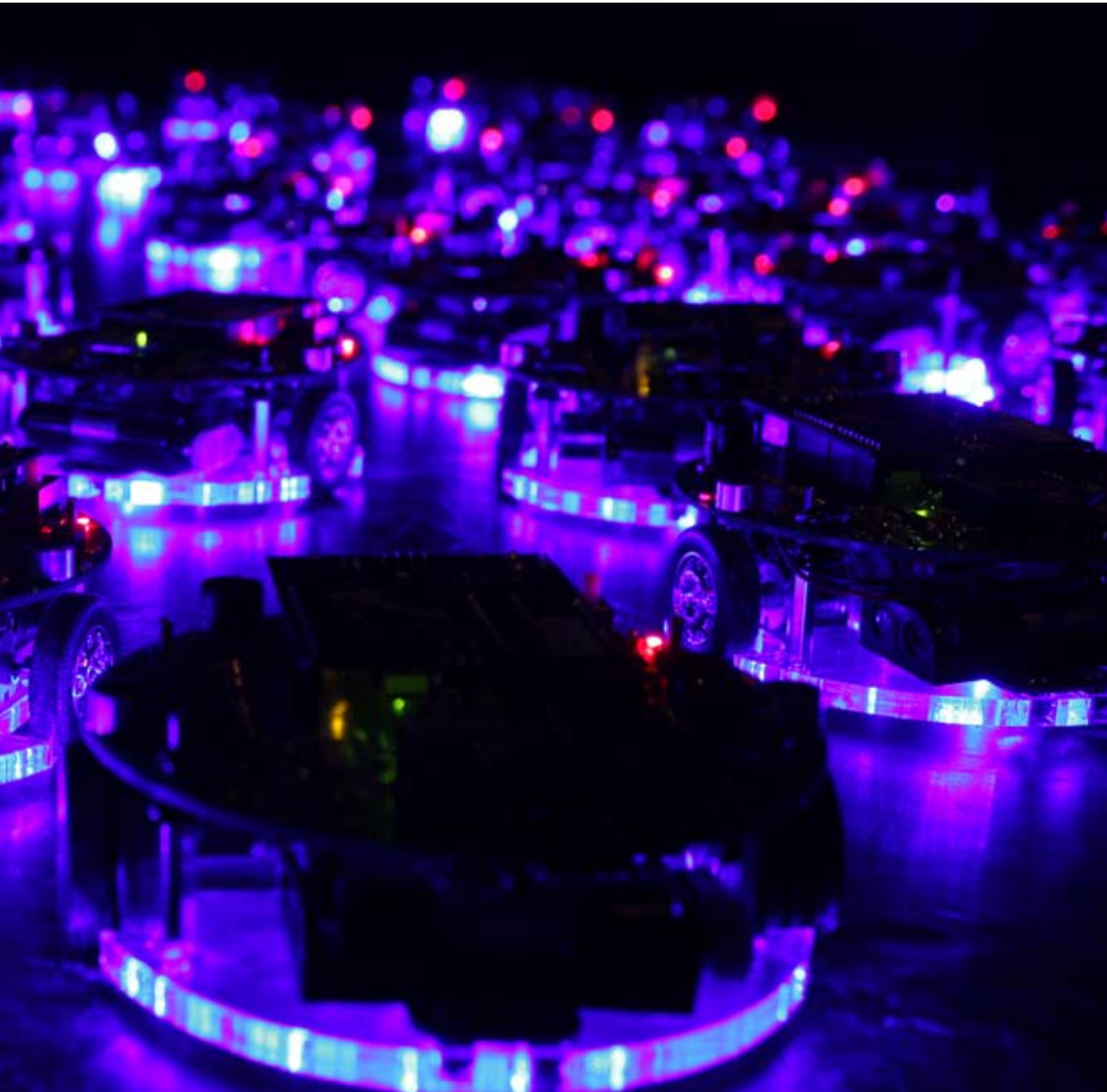






Becoming a designer is not merely about being able to deliver qualitative excellent systems, products and services, it is also about the process and competency of accomplishing this excellent design, and the process of becoming a competent designer. Therefore, learning and assessment focus at ID on the overall competence of designing, including the vision on designing, as well as the growth as a designer during the study. Reflection in and on action (Schön, 1983) as well as reflection for action are paramount mechanisms to become aware of what one has learned, and to stimulate and direct this growth. Moreover, students create/update their showcase elucidating their development as a designer over the past semester, in the context of their history as a designer up to that point, and in relation to their envisioned development in the future. Based on this interactive showcase they are assessed at the end of each semester. All in all, we facilitate our students go through different stages during and after their study, from blank to awareness to depth and when they graduate as Master of Science they have reached the expertise stage, hopefully moving towards the visionary stage.

For more information about our educational approach, see Hummels and Vinke (2009).







# ID' 09

The student projects presented at ID'09 are a result of our focus and approach. We regard their designerly competencies instrumental in creating the future generation of subtle, nuanced and beautiful interactive and intelligent systems, product and service proposals. We hope that the results presented at ID'09 and in this booklet reveal new designers of intelligent systems that could change the world.







Master  
Graduates





by Guus Baggermans  
coach: Kees Overbeeke

Most modern machines are designed with one goal in mind: cost-efficiency. The user experience takes second place. The result of the project is a buttonless vending machine that communicates on a more personal level with people. The vending machine invites people to explore all of its possibilities to interact. By following the users' movements through space, the soda-cans show that they can see him. The user will come closer to see what is happening, and maybe even buy a soda-can.





by Floortje Mattheijssen  
coach: Loe Feijs

Client: MMC Maxima Medisch Centrum, Veldhoven

During the project I created an improved comfortable sensor belt that can measure the heart rate of the fetus and the activity of the uterus. This information is used to observe the health condition of the fetus and to visualise the fetal movements for the mother and close family. The belt gives a simplified visual image of the fetus movements. The inspiration for this design comes from a diary study with pregnant women and their families. The belt can increase the bonding between mother and child, and have a positive influence on the lactation.



by Arne Wessels  
coach: René Ahn

Client: Snooker en Pool Centrum, Woensel

The SonicCue provides pool players with real-time generated audio feedback based on undesired cue movements. This sonification enhances the pool player's perceptual system so that subtle cue movement errors can be perceived more consciously. Ultimately, the pool cue is moved perfectly straight during a shot which will not generate any audio. But rotation and sideways cue movements generate different audio signals to inform the player via wireless headphones. This abstract audio continuously informs about the cue deviation. In this way, players perceive their errors immediately and can explore the effects of changes in technique, and train towards a straighter stroke.





by Eva Deckers  
coach: Stephan Wensveen

Client: Prof. Kees Overbeeke, Designing Quality in Interaction Group

PeR, Perception Rug, is a knotted carpet in which touch sensitivity and optic fibers are integrated. PeR has the ability to perceive and react to perceptive activity of people. PeR can adapt different perceptive behaviour. PeR is designed to show how design theory on perception can be applied in our environment. The most important notion of the theory is that, by nature, perception is always an interplay between the perceiver and the perceived. By giving an artifact like PeR perceptive behaviour, this interplay can be enhanced resulting in a greater feeling of association and involvement of the user.



by Jabe Faber  
coach: Panos Markopoulos

Client: Philips Research

Aulura is a system that motivates users to be physically active and lead a healthier lifestyle. The interactive ambient picture frame provides feedback and persuasive cues regarding the physical activity level of a user, measured through an activity monitor that the user carries. The device draws users' attention by reacting to the presence of people, adjusting its content and interactivity as it is triggered when people approach the device. It draws users to inspect data regarding their activity and provides feedback regarding their achievements. Preliminary tests show that users experienced a positive and pleasurable interaction, which was anticipated as persuasive and motivating.



by Saskia Bakker

coaches: Elise van den Hoven,  
Alissa Antle

In collaboration with: Simon Fraser University and The  
School of Interactive Arts and Technology, Canada

Movement and exploration play an important role in cognitive development. The interactive learning objects “Move | Learn | Explore”, designed for 7 to 9 year old children, link specific movements to the musical concepts of pitch, volume and tempo. By rotating one of the objects, for example, the pitch of the music changes. When squeezing another object, the music will become louder. By moving these objects, children learn to structure their understanding of the abstract concepts in terms of concrete movements. This enables them to use expressions they are already familiar with, when reasoning about the new concepts of pitch, volume and tempo.



328.362

by Jos Verbeek

coaches: Berry Eggen,  
Tilde Bekker, Janienke Sturm

Client: Creative Conversion Factory

Intelligent Playground objects are play objects that use advanced technology to react to the interaction with children, and actively encourage the children to play. These objects contribute to the physical, social and cognitive development of children by providing them with opportunities for free play, and stimulating them to play together and be physically active. Within the Intelligent Playground context, the ColorFlare has been developed to stimulate physical activity by reacting to physical input such as shaking, rolling and waving. Social interaction is encouraged by enabling children to send their ColorFlare's colour to the ColorFlare of another player.





by **Lissa Kooijman**  
coaches: Loe Feijs,  
Jan Hendrik Croockewit, Gerbrand van Hout

Client: Nedap Healthcare and  
Catharina Hospital, Eindhoven

The 'eetMeet' is a plate designed for overweight people who consume their evening meal too quickly. Since eating is part of our daily routine, it is very difficult to change our eating pattern. The eetMeet guides us towards a normal pace of eating by setting an eating rhythm by means of tiny lights in a porcelain plate. When you take a bite, the plate calculates how long you should normally take over eating such a bite, and the lights go on for that length of time. When the lights go out, you can safely take the next bite. The problem of eating too quickly is created when the delayed signal of being satisfied does not yet agree with the actual filling of the stomach. The eetMeet helps you to change your eating behaviour.



by Jurgen Westerhoff  
coaches: Aarnout Brombacher,  
Ronald van Tienhoven

The FEAR INDUCER is a mobile device that takes the thrill out of the theatre, and makes it possible to get a scary experience anywhere. It uses audio samples to induce different types of distress, from a feeling of unease to a proper scare. Instead of sticking to a script, the system builds an experience around the user's bodily feedback. The system senses when the user is startled by external stimuli, and adapts the intensity of the experience. This way, the context, the system and the user's imagination all contribute to a thrilling climax.



by Joris Zaalberg  
coach: Oscar Tomico

Client: BMAT | Barcelona Music and Audio Technologies

Jukebugs are smart music players, sensitive to light and motion. They allow casual music listeners to (re)discover their often unexplored digital music collections through their environment. You can influence a Jukebug's music choice by exposing it to different lighting situations: play with the location and orientation of the device or change the lighting situation itself. The more you move the Jukebug in the process, the more diverse its music choices will become. The Jukebugs' continuous behaviour and use of a smart music database create a natural and unobtrusive way of interacting with music that creates a new and improved casual music listening experience.



by Ralph Zoontjens  
coach: Stephan Wensveen

The Flowtime system comprises an interactive jacket that guides people when practising yoga postures at home. The jacket contains soft sensors and a belt with vibration motors on the back. A device worn on the front of the belt connects to software with a virtual yoga trainer that encourages the practitioner to align breath and movement. The vibrations help this guidance by following a wave-like pattern. This way, technology becomes a peripheral signal that recedes into the background of awareness, and helps people become one with their body and mind.





by Brian Garret  
coach: Joep Frens

Client: Freedom of Creation

Brian worked on a new concept for product customisation. He created headphones that can be customised with the input of personal music taste from the customer. Nowadays such information is widely collected through our digital behaviour, allowing Rapid Manufacturing companies like Freedom Of Creation to create truly personal products, by turning our digital behaviour into physical products.



by Wouter Kersteman  
coach: Joep Frens

Client: Panos Markopoulos, User-Centered Engineering Group

The collective potential envisions a 'library of skills' as a repository of design knowledge and skills. It is to be a place where both students and staff can 'deposit' and 'acquire' knowledge and skills relevant for design. The system consists of a series of dedicated cameras, located in the workshops, which users can use to make video reports of their design action. These video reports are annotated and published to the 'library of skills.'

This library can be accessed on the web or at one of the kiosks. Users can then view the videos and apply these skills in their design process. It allows them to 'stand on each other's shoulders' and it can act as a lever for new learning experiences and insights.





# Highlights:

Bachelor and Master Projects





# Tell'M

by **Sander Bogers**  
(bachelor: 2nd year)

*coach: Philip Mendels*

Tell'm makes use of digital footprints that can be controlled by large physical objects. By controlling the footprints the children can create many different stories lines. Imagination is triggered by the abstract appearance of the footprints and objects, but on the other hand focus is provided by the concrete actions of the footprints. The children need to think of storylines before acting. This results in storytelling through the play.

# Jakob

by **Paula Kassenaar**  
(bachelor: 3rd year)

*client: Coolen: ATTRACKZ*  
*coach: Stephan Wensveen*



Jakob is a creative addition to the armrest of your sofa. With Jakob you can play, share and communicate with your family or household members. The main function of Jakob is to record messages. This may sound a bit basic, but the playful interaction, rich materials and inviting location ensure that the experience with Jakob is definitely not basic. It forms a platform for a wide variety of social and nonsocial interactions. Playing games together, leaving messages for one another, teasing each other or reminiscing by finding back sound snippets of memorable moments are all examples of the possibilities Jakob facilitates.

# SmartGoals

by **Chris Heger, Sjef Fransen**  
(master: 1st & 2nd year)

partners: *Ko:work, GTD TU/e and STW*  
coach: *Mark de Graaf*



ID'09 shows the second edition of SmartGoals that is the result of an investigation of the technological and commercial feasibility of the concept. It is a system of seven interactive goals. It is especially suitable to train aspects of modern soccer such as fast, creative circulation of the ball. The interaction with the system does not require specific knowledge outside the domain of soccer. This patented design will be tested with PSV in the near future. At ID '09 the visitor can experience the potential benefits of these intelligent goal markers for soccer training purposes.



# Wear your true lifestyle

by **Gordon Tiemstra**  
(bachelor: 3rd year)

client: *Cesar Therapy Netherlands*  
coach: *Anna Maria Cornelia de Gersem*

This project focuses on a combination of teenagers, lifestyle, identity and smart fabrics. It researches the problems teenagers in the age group 12 to 16 encounter with their identity and the way they deal with how to present themselves. What they often forget in their visual appearance is their posture, which changes a lot due to physical growth during puberty. This product stimulates teenagers to work on a positive posture via subtle use of current developments in the area of smart fabrics. Sensors integrated in the fabric are capable of measuring the posture and are able to interact on this via integrated vibration actuators.





## Living in a Fantasy

by Zaza Zuilhof, Sarike van Wijgerden,  
Rico Minten, Gijs Houdijk  
(bachelor: 2nd year)

*coach: David Morgan*

In this project we were asked to design an interactive storytelling environment for the challenging target group of 2 to 6 year old children, which had to be placed in a public environment. We designed 'Stuur naar Avontuur' an interactive environment where children can travel from world to world with their magic vehicle. In each world there are surprises waiting to be explored.

## Light based expressive signage

by Nadine van Amersvoort,  
Dave Senden, Teun Vinken  
(bachelor: 2nd year)

*coach: Oscar Tomico*



The future will provide the user with recommendation systems that enrich the shopping experience. The user no longer has to shop online to get a personal recommendation. The system supports and guides customers in finding items connecting to their personal style. Based on the user's first selected product in their basket, additional items are recommended through illuminated hangers. This embedded light system will transform the future clothing shop into a smart environment using light indicators to point out personal recommendations to the user. The system provokes a more interactive and explorative shopping experience for customers.



# Mustick

by Joris Zaalberg, Wouter Kersteman,  
Floor Marttheijssen, Tom van Bergen  
(master: 1st & 2nd year)

coaches: Kees Overbeeke, Stephan Wensveen



Conceived from a project on embodied interaction, Mustick is a design that allows non-musicians to perform songs of their favourite artists for family and friends at parties and social gatherings. The device is exemplary of products allowing non-musicians to perform songs without the steep learning curves common in musical instruments. These designs use the expressive powers of the human body to interact with pre-recorded music in meaningful ways. Mustick allows users to manipulate the playback of any song in real-time - simply by moving, shaking and swinging the device. The direct control of musical content creates a dialogue between user and music, turning the listener into a performer.



# Sono

by Julien Amoureux, Olaf Corduwener,  
Martijn Kelderman, Joeri Oomen  
(bachelor: 2nd year)

coach: Maurits de Koning

The Sono is a sound installation which allows people to experience and create music in a new and unique way. The focus is on an expressive touchless interaction. People can create music through modulating sound samples by moving their hand within a 3-dimensional field above one of three goblets. Sound samples can be implemented by recording their own voice or other random sounds. People can work together and make use of all three goblets to create a musical performance.



# Posters & Videos



# Jewelco

by Peter Hermans  
(bachelor: 3rd year)

Jewelco is a highly innovative website that brings jewellery designers and jewellery customers together and enables them to codesign precious jewellery fully online using integrated, cutting-edge, technologies:

- Online webcam-phoning and –chatting to enable rich and flexible online communication between customer and designer.
- Augmented Reality to let the customer and designer view a virtual design as if they are wearing it without the need for a physical model.
- Finally, Rapid Manufacturing (aka 3D printing) is used to create the jewellery.

With these technologies Jewelco makes the jewellery codesign process more accessible, cheaper and faster – while keeping it personal.

client: Freedom of Creation & Shapeways  
coach: Bert Lonsain



# ROC

by Mark Studer, Ruud van Zetten,  
Allan Tan and Liren Tay  
(bachelor: 2nd year)



The ROC consists of a decentralised system of interactive chairs in an outdoor area which enables young people to socialise with their friends in a space that truly belongs to them. Depending on how the users interact with the chairs, jumping, lying down, or swinging for example, makes the atmospheric lights of the other chairs change colour, blinking faster or shutting down reflects their characters. The ROC gives young people a feeling of control over the atmosphere and it challenges them to discover with other teenagers new kinds of game play elements.

client: Kompan  
coach: Mark de Graaf

# Flowe

by **Jorien Kemerink**  
(bachelor: 3rd year)

Flowe is a dynamic space-divider that reacts on human touch. By its expressional forms and organic movement, Flowe can enhance different feelings and emotions that come with different occasions, and create a more dynamic, changing and desired environment to live or work in. A room is never used only in one specific way; each activity brings its own character and feeling. I envision a world in which technology is less obtrusive and annoying; technology that is in the background of our attention until the moment we actually want to use it. Based on this principle, Flowe is designed in a calm way, making people think about how they would like the character of the space; more open, or closed. The direct interaction of the transformation provides a moment of reflection before changing activity.



coach: *Maurits de Koning*

# MedicAID

by **Jeanine Kierkels**  
(bachelor: 3rd year)



Day in day out, nurses administer medication to patients: a task that bears a lot of responsibility. Nevertheless it is proven that nearly 20% of all medical mistakes are caused by medication errors.

The interactive device MedicAID is designed for hospital nurses to support the administration of the appropriate doses of medication to the patients of the IC neonatology & IC children. MedicAID assists the nurse in this process of medication calculation and helps them to understand whether the dosage he or she has calculated is correct.

clients: *Panton & Erasmus MC Rotterdam Sophia Kinderziekenhuis*  
coach: *Jean-Bernard Martens*



# Dancerail

by Eric Toering, Frank de Jong,  
Pakwing Man  
(master: 1st & 2nd year)

Dancerail is an interactive installation to deepen the understanding of theatergoers coming to see a dance piece by Wayne McGregor and Random Dance at the Sadlers Wells in London in October 2009. The installation stimulates people to experience and think about movement with their body. They can experience a movement from the dance piece, by interacting with the rail and its lighting pattern. As soon as touch is detected, the lighting adapts and flows through the rail, along with the hand movements of the visitor.



client: Random Dance  
in collaboration with: University of California San Diego  
coaches: Kees Overbeeke, Philip Ross,  
Caroline Hummels and David Kirsch

# Caspr

by Jaap Knoester, Martijn Jansen  
Chen Pei-Chun, Ibai Perez  
(master: 1st & 2nd year)

What if your products are also treated like guests when you are on a visit? Caspr is a concept for a system of digital products that display hospitable behaviour towards the guests' digital products. Three products were proposed: a router, a power supply and a set of speakers. For example, the speaker system shows curiosity and enthusiasm towards the guests' music phone by turning towards it as if the speakers are looking for 'eye-contact' and subsequently start wobbling enthusiastically. After connection, the mobile phone is conversing with the speakers and the guest can control the music from his phone.

Special thanks to /d.search labs.  
Project done as part of the Creative Challenge,  
issued by Philips Research.

client: Philips Research  
coaches: Philip Ross, Jun Hu, Lu Yuan, Caroline Hummels and Jacques Terken



# Walk!

by **Stefan Zwegers**  
(master: 1st year)

Walk! is a shirt for women between 20-30 years who want an active lifestyle. In the morning a pedometer module is attached to the shirt, which registers the amount of steps that are taken during the day. The pattern is printed in thermo chromatic ink. When a piece of ink changes color, a line is created between two spheres. The more steps are taken, the more spheres are connected. The wearer gets an indication of the number of steps by looking at her shirt.

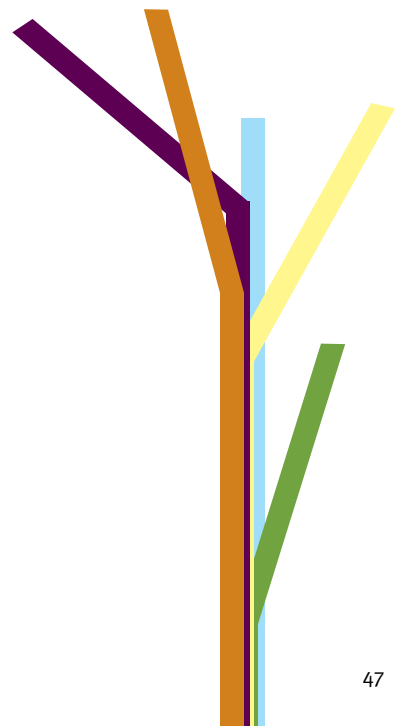
A user evaluation with women of 30-45 years revealed the following values: Safety, Privacy, Pleasure, Enjoying life and Healthy. The second iteration uses lighting to provide feedback. The wearer can decide for herself if she wants to show her progress or keep it private, by changing the way she wears the garment.

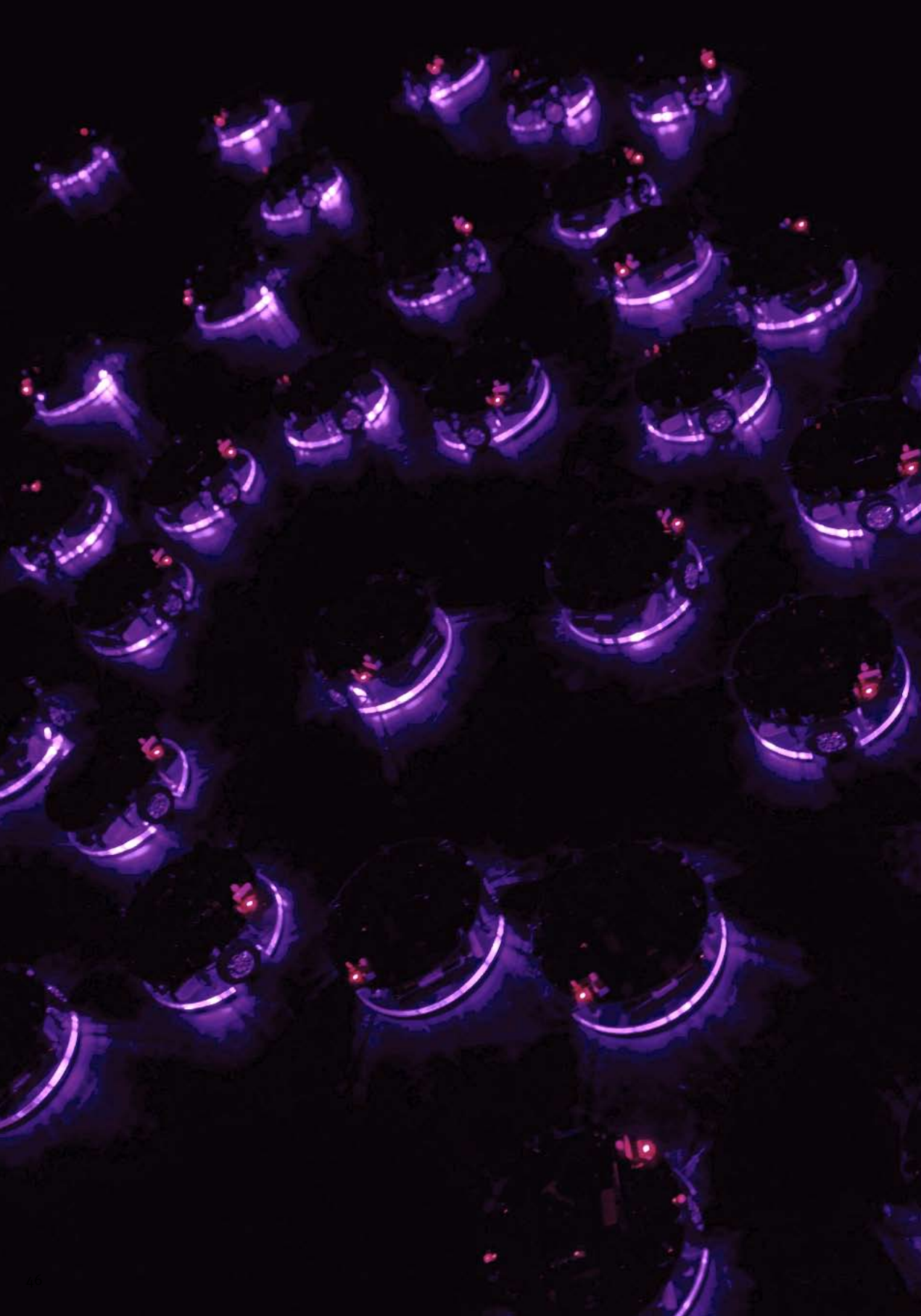


*client: adidas Group, adidas innovation team*  
*coaches: Stephan Wensveen and Michel Peeters*

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