The Department of Information & Computing Sciences is one of the six departments of Utrecht University's Faculty of Science. The department has four research lines: **Artificial intelligence, Interaction Technology, Software systems, and Virtual Worlds.** Our researchers educate students in our Bachelor's and Master's programmes in the latest developments in their respective fields of expertise.

### Artificial Intelligence

Our *Artificial Intelligence* researchers work on the design and analysis of intelligent systems that support people in making better decisions. The research is focused on the concepts of multi-agent systems, probabilistic reasoning, emotion models, machine learning, data mining, optimisation algorithms, and algorithmic complexity.

*In collaboration with Prorail, NS, the Port of Rotterdam, and other knowledge partners, the Intelligent Systems group is involved in the development of computer models for self-organising freight trains. The models work with parallel auctions involving the leasing and trading of railway sections at specific times, trains with different lengths, container space on trains, and loading and unloading services. To study such models, the Intelligent Systems group is developing agent-based simulations that help determine the effectiveness, functionality and robustness of self-organising trains.*

### Interaction Technology

The interaction between various media, virtual worlds, users, and their environment is the focus of the research line *Interaction Technology*. Researchers work on discovering and designing the algorithms needed to understand and interact with – or through – these media. The research addresses multimedia analysis, user experience, multimodal interaction, and persuasive technologies, as well as their applications in (applied) games.

*Lie detection by Ronald Poppe, item on national news. The ‘lie detection suit’ gives a detailed analysis of movement of subjects from motion capture equipment or video. These techniques can also be used in social surveillance and as input for computer interaction.*
Software Systems

Our Software Systems researchers study the technologies to describe, construct, and adapt software systems, and their architecture, engineering, production, and deployment. The focus of this research line is not only on how programming languages, methods, and tools can be designed and applied to support the construction of programs and related artefacts, but also on the understanding of information-based processes in organisations. The research addresses advances in embedding of Information Technology in communication and organisational structures, business IT alignment, and product software.

Communicate is a simulation tool for practicing communication skills, developed by Johan Jeuring. The tool is adopted by local health centres (through Volksgezondheid Utrecht) and contains software technology for learning and teaching.

Virtual Worlds

Virtual Worlds is all about exploring real-world problems through a digital lens. Researchers study the modelling, visualisation, animation, and simulation of virtual worlds and the characters that inhabit them. The goal of this research line is to create technologies for highly effective interactive experiences and environments for simulation, learning, entertainment, and training experiences. Research topics include frontiers in motion in virtual worlds, multimedia analysis, and interaction technology.

Crowd simulations in a virtual environment helped the municipal government prepare for the Grand Départ of the Tour de France. Roland Geraerts developed models to help the police in planning the surroundings of the cycling course and testing the prognoses for the flows of the spectators. The models were developed in collaboration with the engineering and consulting bureau Movares.

Contact

Collaborate with students
Internships or group software projects with Bachelor’s students: contact Jeroen Fokker, J.D.Fokker@uu.nl.
Internships with Master’s students: contact Frank van der Stappen, A.F.vanderStappen@uu.nl.

Collaboration
There are several ways to collaborate with the Department of Information and Computing Sciences, and such cooperation is very much appreciated by the department and the students and researchers involved.

For a full overview of possibilities and a portfolio of examples, see see http://uu.nl/ICS-collaboration

Collaborate with researchers
Contract research: contact Martin Kempen, M.G.Kempen@uu.nl.
Collaborate on NWO or EU calls: contact Thomas Dohmen, T.Dohmen@uu.nl.