

THE NETWORK INSTITUTE 2.0



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The Network Institute



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This brochure will give you a brief introduction to The Network Institute, one of the largest Interdisciplinary Research Institutes at the VU University Amsterdam. The Network Institute "2.0" has been formed by joining the Network Institute with the CAMeRA institute.

The Network Institute is a collaboration between researchers in Computer Science, the Social Sciences, the Humanities, Economics, Law and Philosophy. In this brochure, we describe the research questions that are addressed by the members of the Network Institute, the societal challenges that we tackle, the Tech Labs infrastructure that we are hosting, and, last but not least, we're answering the question for you: "What's in it for me"?

Frank van Harmelen,
Scientific director



MISSION STATEMENT

The Network Institute

"Connectivity is changing our world"

Networks offer highly flexible and versatile forms of association and organization across boundaries. Driving these networks is a continuous process of creating and changing connections, of exchanging and sharing information and knowledge. The shapes of these networks display patterns of collaboration as well as conflict, of community formation as well as separation and isolation. Modern networks have a fundamental impact on how we work, think, and act. This makes the study of these networks and their properties an urgent scientific and societal challenge.

The Network Institute studies the technological, economic, social and communicative aspects of networks. It brings together a unique combination of scientists from informatics, social sciences and humanities. There is new science to explore, in order to understand and deal with our increasingly connected world.

The social sciences and humanities are getting more computational, and computing is getting more human and social. This makes it necessary to combine the power of information and communication technology (ICT) with knowledge from the social sciences and humanities. ICT will provide the data, methods and means to boost the social sciences and humanities into a new era, while the social sciences and humanities will provide a better understanding of the opportunities and risks of strongly networked systems.

The mission of the Network Institute focuses on four integrative research areas which together capture the shared interests of our members:

- the digital planet
- the knowledge society
- the dynamic organisation
- the networked individual

With these four research areas, we are able to study the modern network phenomena comprehensively. Our research encompasses very different scales, from global patterns to single individuals, and we study networks of a very different nature: networks of individuals, of organisations, of technical devices, of knowledge or indeed of mixtures of these.

The construct of a "network" functions as a unifying conceptual, theoretical, methodological and technological theme across the different research areas. Networked structures are emerging as a central concept in all of the disciplines in the Network Institute. Modelling a diverse set of phenomena as networks, exploring their structural properties in a science of networks, and studying their nature, origin, content, structure and evolution leads to useful cross-fertilisation and technology transfer between our diverse fields.

As modern networks are deeply influencing our social world, our research programme is not only scientifically but also highly societally relevant. Relevant external stakeholders for the Network Institute include enterprises in the converging sectors of ICT, media and the creative industries, as well as organizations in healthcare and education, including the relevant agencies of local, regional and national governments. This directly links to

activities of the Amsterdam Economic Board, the Dutch Topsectors, and the National Digital Agenda. Institutions for professional education (HBO) such as the HvA and the Rietveld Academie are important stakeholders in the creative sector. Some current exemplars of societal challenges that our research addresses are:

- helping with the information and knowledge overload;
- ensuring security, privacy and trust;
- accelerating science through e-Science;
- improving health & well-being through e-Health;
- worked world;
- improving access to our cultural heritage.

While we expect our four basic research themes - the digital planet, the knowledge society, the dynamic organisation, the networked individual - to be relatively stable over a longer period of time, we also expect that the societal challenges and applied aspects of our research are more fluid and may change more rapidly - in line with current societal dynamics itself. On the next pages, the research areas and societal challenges are described in more detail.

RESEARCH THEMES

THE DIGITAL PLANET

Our modern world is pervaded by computing devices, large and small, professional and personal, for sensing and acting, under our control or unnoticed, etc.

Example questions:

- How is the creative industry facilitated by the increasing digitisation of our world?
- And how does this increasing digitisation influence our experience of the past, our relation with our cultural heritage, and our identity as an individual and as a group?
- Which information technologies are the next key steps in the further developments of our digital society?
- Security, privacy and sharing of information are uneasy bedfellows. How can we maximally share information and knowledge with maximal transparency while at the same time ensuring security and privacy?
- How to deal with undesirable side-effects of our digital planet, such as social exclusion, the digital divide, cyber-bullying and digital piracy?
- What are the opportunities and risks that arise as a consequence of the growing digitization of information and knowledge in increasingly interconnected, self-organizing and dynamic systems? Opportunities and risks in terms of the value, availability, correctness, reliability, subjectivity, changeability, monitoring and authorization of knowledge?

THE KNOWLEDGE SOCIETY

Knowledge is increasingly becoming a crucial resource for both individuals (determining their value on the labor market or as independent workers) and organizations (whose competitive edge increasingly depends on the knowledge they create and use to innovate). Creating, sharing and retaining knowledge are key issues in an increasingly globalized economy where innovation is a central value.

Example questions:

- What methods, tools and technologies can be developed to support organizations and individuals in retaining their most strategic and innovative knowledge, as well as in the development and acquisition of relevant, up-to-date knowledge? How can we support lifelong (organizational) learning?
- How can technologies such as e-Learning, serious gaming and the use of smart devices contribute to new forms of education in the knowledge economy?
- What will the knowledge systems of the future look like? To what extent will ICT-based systems be able to represent the richness and complexity of tacit, practice-based knowledge, and what is the possible role of such systems in responding to the main challenges of the knowledge economy?
- How can the creative industry be supported in facing its main challenges in the knowledge economy, such as questions about the effects of new media, the development of new technologies and how to manage creative processes? How does the increasing digitization of information and knowledge, influence the creation, sharing and retention of knowledge about our cultural heritage?

THE DYNAMIC ORGANIZATION

Our society is becoming increasingly networked, not only through ubiquitous digital connectivity, but also through economic globalization, through increased mobility of people, and through the modern mass media.

Example questions:

- The deep integration of ICT requires new theories about design, functioning and impact of socio-technical eco-systems.
- How do modern digital networked media change knowledge acquisition and knowledge-sharing both by individuals (e.g. via transactional knowledge) and by organizations (e.g. using knowledge-sharing platforms, monitoring the social media)?
- Do new social and technological networks contribute to more efficient and transparent forms of government, or do they instead undermine their legitimacy of our democratic institutions?
- How should previously inward-facing institutions and enterprises deal with the growing demand in society for openness of data, information and knowledge?

THE NETWORKED INDIVIDUAL

New networked media have a large effect on the daily life of individuals. It changes the world in which we live and our behaviour as well.

Example questions:

- How does the digital world shape our personal experiences, both in public and in private?
- The deep integration of ICT in our daily lives, and even into our own bodies, raises fundamental questions about cyber-physical systems: are they possible? Are they desirable?
- How do the new networked media facilitate spreading of information, and how does this influence our norms and expectations about communication?
- How does the new ICT-based connectivity affect our personal environment? How does it affect the lifestyle of individuals and families?
- How can psychological or behavioral models of "economical behavior" explain how users respond to the overwhelming amount of available information, with theories about the "distribution of attention" or the "selective spending of resources like time and effort in knowledge acquisition".



SOCIETAL CHALLENGES

HELPING WITH THE INFORMATION AND KNOWLEDGE OVERLOAD

The availability of information and knowledge has increased to an unprecedented scale due to the rise of various new Internet-based ICT applications. Moreover, the virtualization and globalization of our society and the increasing speed of change have tremendously increased the dynamic (and volatile) character of information and knowledge resources. Thus, the value and validity of information and knowledge is subject to rapidly changing perceptions, making a concept like “well-informed decision” almost obsolete. Through the ubiquitous availability of these resources, and the increased rate of participation by various actors (consumers, organizations, individual stakeholders, policy makers) in creating them, the quantity and diversity of information and knowledge has become nearly impossible to manage. There is a rapidly growing need for mechanisms that help us cope with these dynamics – from methods to facilitate the creation, sharing and retention of knowledge to intelligent systems that help us sift through the wealth of information.

ENSURING SECURITY, PRIVACY AND TRUST

Trust is a *conditio sine qua non* for all transactions and inter-human communication. In a society that is increasingly interconnected, the trustworthiness of socio-technical systems depends on a myriad of components linked in ways that are frequently obscure and implicit. Moreover, these systems (whether they be enterprises, governments, or even society as a

whole) are highly dynamic and adapt constantly to new circumstances.

Trust is forged by security, control of privacy sensitive data, access to information we can rely on, and, in general, systems that work. Trust is threatened by the endless list of failures that we have seen in recent years, in a world where trains stop running because of software bugs, where attackers compromise nuclear reactors and Certificate Authorities, where companies and governments keep losing sensitive data, and where the failure of many major ICT projects (passports, electronic medical dossiers, and public transport cards) undermine the public faith in these systems. As we clearly cannot afford the trust in our digital world to be eroded by such incidents, the question is, how can we prevent it?

ACCELERATING SCIENCE THROUGH E-SCIENCE

The alpha- and gamma-sciences (the humanities and the social sciences) are becoming increasingly digital. They are increasingly using very large and heterogeneous data sets, and advanced tools and algorithms to analyse such data. The development of e-Science, which is by now widely accepted in the natural and life sciences, is now also taking place in the alpha- and gamma-sciences (e-Humanities, e-Social Science). This makes it possible to perform quantitative analyses on very large social structures. Also, cultural artifacts from the distant and the recent past are rapidly becoming available in digital form. Such new analysis- and observational methods in turn give rise to new algorithms for large scale data-analysis, - integration and -visualisation.

IMPROVING HEALTH & WELL-BEING THROUGH E-HEALTH

Our health care system faces numerous challenges regarding its coverage, cost, and quality. e-Health aims to contribute sustainable solutions to these challenges. e-Health is concerned with the use of digital technologies and new media for the delivery of health-services across the total care spectrum, from well being, prevention and treatment to chronic care, and for all age groups, including the elderly, as well as for improvement of health care delivery (e.g. electronic patient files), professional education (e-learning), and online research, in both physical and mental health. e-Health aims to develop health-related clinical, social and technological knowledge and products. e-Health research in the Network Institute has productive collaborations with related work done in the EMGO and Talma institutes, but has its own character and strength, building on the specific expertise of teams in the Network Institute in Social Science, Computer Science and Language and Communication.

UNDERSTANDING CULTURAL IDENTITY IN A NETWORKED WORLD

Communicative acts acquire their meaning inside cultural groups, and vice versa, cultural groups are formed by shared communicative acts. Globalisation is putting increasing pressure on our cultural identity, and by consequence also on our individual identities. This causes an opposite reaction: the need to preserve or re-invent traditional identities from our cultural heritage. The digital world offers new possibilities to fulfill this need. Cultural heritage in digital form is now more widely accessible than

ever before, users can personalise their interaction with this material, and they can use commentaries to express the identity of both themselves and of the groups to which they belong.





OUR TECH LABS

With its Tech Labs, the Network Institute hosts three state of the art experimental facilities, that cover a wide range of technologies. The labs (described below) are at three different locations, but have a single point of contact. The labs come with full support, from idea creation, through implementation to publication. And if the labs don't quite provide what you need, we can build custom solutions, in both hardware and software. If you want to run an experiment, if you want to know more, or if you just want to play, contact Marco Otte (techlabs@vu.nl).

GAME CELLA'

This 100% flexible, high-tech laboratory with an ever-growing resource bank is ideal for creating and conducting any kind of new media experiment. The large space offers you endless possibilities to create environments specifically suited for your research. The broad range of equipment makes it possible to use, create and adapt almost any hard-and software you think off.

INTERTAIN LAB

This high-tech modern futuristic lab space offers you a natural environment with many user-centered experimental possibilities. The lab's integrated systems can track users, study their behavior, monitor physiological parameters and act as a showcase for state-of-the-art technology. You can combine different connected audio-visual technologies and study the effects on the users. The lab space also offers possibilities for special meetings, workshops, lectures, presentations or anything you can think of.

MEDIA LAB

The Media Lab can be used to perform reading time and reaction time experiments as well as behavioral observations of people who are confronted with media products. In the Media Lab, you can record conversations, sample facial expressions with Webcams, do telephone surveys, and code language and visual materials. The Media Lab has sound proof cubicles for experimentation, an experiment room, and a large meeting room for group observations, equipped with 10 PCs, telephone connections, microphones, cameras, and an LCD projector.

FACILITIES

- State-of-the-art workstations for creation and processing of any type of data
- Game consoles (PS3, Wii, Xbox)
- Physiological sensors
- Two large (3+m diag) projection screens with surround-sound
- Video and audio recording and editing equipment
- Several physical robots, including a Hanson Robokind (summer 2012)
- Programmable on-screen avatars
- Affective and ethical (summer 2012) modules to add to avatars
- Real-time object location, follow users on mobile, Web and in physical worlds
- Multi-Touch table
- Programmable Virtual Reality home-trainer bicycles
- Virtual Reality tools to develop virtual environments
- Virtual Reality hardware for immersive virtual experiences
- Video conferencing
- Eye tracking

THE NETWORK INSTITUTE: WHAT'S IN IT FOR ME?

STUDENT ASSISTANT PROGRAMME

Each year we finance an intensive programme of student assistants that help with collaborative research projects between groups that participate in the Network Institute. Positions are awarded in an annual competitive procedure.

TECH LABS

We run three tech labs: the Game Cella' in the FSW building, the Intertain lab in the FEW building, and the Media Lab in the main building. These labs have a wide range of facilities for all kinds of experiments: motion trackers, eye trackers, video wall, head-up displays, response-time experiments, on-body measurement devices, electronic pets, and much more. The labs come with full-time support staff.

SUPPORT FOR COLLABORATIVE PROPOSAL WRITING

We have a support fund for helping you to write proposals with groups in the Network Institute. For example for travelling costs for preparing EU proposals, or for hiring a copy editor, etc.

FUNDS FOR WORKSHOPS AND SEMINARS

We can give financial and organizational support when you are organizing seminars or workshops that are of interest to groups in the Network Institute. We can help pay travel costs for foreign members of PhD committees if they also give a talk of interest to Network Institute members.

MOST PROMISING YOUNG RESEARCHER AWARD

We give an annual award to the most promising young researcher (Ph.D. student or max. 1 year after Ph.D.)

MEMBERSHIP INFORMATION

Current groups in the Network Institute are:

- Dept. of Computer Science, FEW
- Dept. of Communication Science, FSW
- Dept. of Organisation Science, FSW
- Dept. of Language, Cognition and Communication, LET
- Research Group Knowledge and Organization, FEWEB
- Center for Law and Internet, LAW
- Axiom Group, PHIL
- Leibniz Center for Law, UvA
- System and Network Engineering research group, UvA

Members of the Network Institute are asked to list "The Network Institute" as a co-affiliation on their publications and grant proposals.

INFORMATION SHARING

We use our mailing list and newsletter to share information with our members about events in the Amsterdam region, about funding opportunities, job opportunities, etc. We also organise networking events between our members and an irregular lecture series.

CONTACT INFORMATION

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