IPN

IPN unites, strengthens, and advocates curiosity driven as well as use-inspired academic research and education in the field of ICT in The Netherlands, so that we can face the (ICT) challenges of today and tomorrow and ensure a bright and sustainable future for our digital society.

Annual report 2023

Content

Preface

Before you lies the 2023 annual report of ICT-research Platform Netherlands (IPN), the platform that unites scientists in the academic ICT-field and acts as the authority for ICT when comes to questions about future demands, wishes and possibilities of ICT science and how research in this area can be prioritised. In 2025, IPN will celebrate its 25th anniversary, a milestone that will not go unnoticed. The Platform is supported by the Dutch Research Council (NWO).

IPN originated from a small group of enthusiastic scientists and has grown into a mature platform with a board, members, and extraordinary members. It is supported by employees who work with great passion and enthusiasm. IPN undertakes concrete actions, organises events and discusses ICT-related topics with policy makers, research administrators and other relevant stakeholders. The IPN board includes representatives from ICT research from Dutch universities. IPN members are all computer science research departments of Dutch academic institutions and the Center for Mathematics and computer science (CWI).

IPN has achieved a lot in the past year with the people in the ICT-field. For example, in 2022-2023, a computer science Sector Image and a computer science Sector Plan were written in a short time, the IPN special interest groups were active and the IPN Equity, Diversity and Inclusion (EDI) Working Group produced a report with recommendations for improving equality, diversity and inclusion in the Dutch ICT-research community. The annual ICT with Industry workshop, with the support of IPN, has again produced a number of innovative solutions for scientifically challenging, commercial business cases. The ICT.OPEN event is now undeniably the leading Dutch event in the ICT-research field, and the Evening Event organised by IPN is a permanent part of this.

With the help and efforts of IPN, in good cooperation with NWO, many connections have been established, networks formed, and cooperation initiated between knowledge institutions, but also outside of them with companies and public organisations. And that is desperately needed. We live in an intriguing time full of challenges. For example, the Netherlands has the ambition to be among the best in the world as a knowledge economy, we must achieve more with fewer resources, and we must live and produce more sustainably. All this requires smart, innovative applications of ICT, while ICT itself is developing at a fascinating pace.

I am proud of what we have achieved with IPN and look to the future of this community with great confidence.

Catholijn Jonker,
Chair IPN board

1   About IPN

1.1   Mission

IPN is a platform that unites and represents researchers in the academic ICT-field and acts as a single point of contact for all matters relating to ICT innovation and its importance for our current and future society. IPN builds and maintains a national community and develops policy to advance the field. The platform actively enhances diversity, equity, and inclusion in ICT.

1.2   Vision

IPN unites, strengthens, and advocates curiosity-driven and use-inspired academic research and education on ICT in The Netherlands, so that we can face the (ICT) challenges of today and tomorrow to ensure a bright and sustainable future for our digital society.

2   ICT-research and ICT-education

2.1   Sector Plan computer science

ICT-research plays a crucial role in addressing the social and scientific challenges that digitalisation and digital transformation entail. In an earlier sector plan, the ICT-field was structurally allocated 8.4 million euros to strengthen the scientific foundation. The first sector plan funds have offered the opportunity to strategically make new connections between the individual research themes, by appointing people at the intersections. Two Universities financing joint positions by two universities in the first round strengthened the collaboration, which will continue. The current sector plan committee provides a role for IPN in monitoring the sector plans. The rapid growth and developments in the sector and the increasing student numbers were reason for an additional application for a structural financial injection in the sector in 2022. The government decided to develop sector plans for scientific education and research for additional jobs and more permanent appointments at universities and is making €200 million structurally available for this purpose. The sector plans ensure clear choices about the division of tasks and profiling of universities, which increases the quality of education and research.

In 2023, IPN published the sector plan for IT, entitled Foundation for the Digital Society. According to the Digital Intelligence Index 2020, the Netherlands is at risk of falling behind, despite its starting position and an excellent digital infrastructure. With a robust digitalisation policy aimed at stimulating science, business, start-ups, scale-ups, knowledge coalitions and government, the government wants to join forces to capitalise on the opportunities that digital technology offers. The strong academic ICT-field in the Netherlands offers a good starting position to provide the desired pioneering role with a solid foundation. Additional investments in education and research are necessary to manage the further transition. IPN has received compliments for the efforts of the ICT-field in general and for IPN in particular from the Minister of Education, Culture and Science, Robert Dijkgraaf in the development of the Sector Plan. Regular consultation with the science deans about the sector plan is held.

FUNDAMENT ONDER DE DIGITALE SAMENLEVING

BEELD VAN
DE NEDERLANDSE
INFORMATICA

Applied research

In order to further connect with Applied Higher Education (HBO), IPN participates in the Advisory Council of PRIO, the platform that represents applied ICT research. IPN aims to optimise cooperation between ICT-research groups at higher professional education institutions and universities, between education and research and between researchers, companies and social institutions.

Top Sector ICT

The Top Sector ICT initiates and coordinates the Knowledge and Innovation Agenda for Digitalisation, or KIA-digitalisation for short. The KIA-digitalisation offers a strategic framework for programming knowledge and innovation in the field of digitalisation and digital ICT within the Mission-driven Top Sectors and Innovation Policy. KIA-digitalisation has been now included for the first time in the Knowledge and Innovation Covenant (KIC) for the period 2024-2027 and forms the framework for investments in ICT-research and innovation for the next four years. There is regular interaction between IPN and the Top Sector ICT, and developments within the Top Sector ICT are shared with IPN by the Science Figurehead of the Top Sector ICT.

2.2   NWO ICT-research

IPN provides input in opening subsidy rounds, mainly from the Dutch Research Council (NOW). In collaboration with NWO and other relevant players in the ICT-field, IPN keeps track of the awards of ICT-research to individual researchers. And last but not least, a special recognition from NWO was awarded in 2023 to an important champion of the ICT-research field. A number of open ICT rounds in 2023 are:

- Cybersecurity for digital resilience (KIC)
- AiNed Fellowship Grant
- AiNed XS Europa Grant
- Collaboration-between-humans-and-semi-autonomous-systems (KIC)

A number of ICT-related awards in 2023 are:

Open competition ENW-M
- Prof.dr. Marieke Huisman (f), UT - *Pallas: Program Analysis for LLVM-IR and All its Source languages*

Open Technology Programme (NWO Domain Applied and Engineering Sciences)
- Dr.ir. Rudolf Saathof (m), TUD - *DAILSCOM: Atmospheric Turbulence Informed Machine Learning for Laser Satellite Communications*
- Dr.ir. Daan Pool (m), TUD - *Right Touch Right Time: Future In-vehicle Touchscreens (FITS)*
- Prof.dr. Ivana Isgum (f), UvA/AUMC - *AI4AI: Artificial Intelligence for Accessible Medical Imaging*

NGF AiNed Fellowship Grants
- Dr. Martijn Starmans (m), EMC - *Radiology and pathology join forces through Artificial Intelligence for Integrated Diagnostics (AIID)*

Computing time on the National Computer Facilities
- Dr. Twan van Laarhoven (m), (RU): *Changing rhythms in Parkinson's disease: development of motor and non-motor digital progression biomarkers based on continuous, real-life monitoring.*
- Prof.dr. Christof Monz (m), (UvA): *Multilingual Language Technology for Machine Translation and Language Understanding*
- Prof.dr. Cees Snoek (m), (UvA): *Scaling Visual Representation Learning by Large Language Models*

KIC call "Collaboration between humans and (semi-)autonomous systems"
- Prof. Ming Cao (m), RUG - *AUTOROBUST: Robust and safe control of remotely operated offshore vehicles*
- Prof. Marie Postma (f), UvT - *STEADFAST – Swarm Technology Enabling Advanced Drone-Facilitated Active Support Tactics for Military and First Responder Operations*
- Prof. Tina Comes (f), TUD - *AI-COMPASS: Adaptive Intelligence in Crowd Crisis Management through AI-Human Coordination and Ethical Practice*

NWO Talent programme Vici 2023
- Prof. dr. G.C.H.E. de Croon (m), TUD -*Neuromorphic Artificial Intelligence for autonomous robots*

Open Science Fund 2023
- Dr.ir. Felienne Hermans (f), VU - *HCCL: Hedy: Community, Content and Localisation*
- Dr. Will Hurst (m), WUR - *IVE-R: An Open-Source Tool for Creating Immersive Virtual Environments using R*
- Dr. Ilaria Tiddi (f), VU - *Automatising the publication of CEUR-WS.org workshop proceedings*
- Dr. Sebastian Junges (m), RU - *StormAE: The Probabilistic Model Checker Storm for Almost Everyone*
- Dr.ir. Joaquin Vanschoren (m), TU/e - *Automated Machine Learning for all*

NWO Scientific Meetings and Consultations Domain Science 2023/2024
- Dr. ing. Jacob Krüger (m), (TU/e) - *FOSD meeting 2024*

ICT-related Athena Award 2023

One of the most important science prizes of the NWO Domain Sciences, the Athena Award 2023, has been awarded to Marieke Huisman. The Athena Award rewards female researchers who are role models for others. Role models are important for female researchers at the start of their career. These role models show that a career in science is possible. In 2023, NWO rewarded two female researchers with the Athena Award including €50,000 prize money. One of them was Professor of Software Reliability Professor Marieke Huisman (UT). Marieke Huisman. She has received the Award because, in addition to her work as a leading and influential researcher (Dutch ICT-prize, Vici and ERC grants), she is actively committed to diversity, equality and inclusion. For example, Marieke initiated the Alice & Eve event (for Women in computer science) and advises the board of the University of Twente on diversity & inclusion in her role as chair of the ambassador network. She initiates, coordinates and supports many proposals and actions in the field of diversity, equality and inclusion.

2.3   ICT-education

Higher education

Many recent analyses, strategies and studies show a growing shortage of ICT knowledge and skills in the Netherlands. The fact that computer science students are highly sought after in the current labour market is evident from analysis by the Research Centre for Education and the Labour Market (ROA) and the Human Capital Agenda ICT (HCA ICT) team within the Ministry of Economic Affairs and Climate Policy (EZK). At the same time, there is an enormous growth in the number of computer science students. To meet the demand from the labour market, new courses are being launched within the computer science domain, such as, in the past year, the BSc courses 'Computer Science' in Maastricht, 'Data science and AI' in Leiden and 'Data science for life' in Wageningen and the MSc programs 'Data Science' in Utrecht and 'Quantum information science and technology' in Delft.

IPN contributes to the challenges in ICT higher education in a pragmatic manner. IPN is looking for connections within existing education to achieve further collaboration with the field. Both top-down and bottom-up, IPN looks for opportunities to implement coordinated improvements within education. To ensure that developments in research and education are properly aligned, bi-annual education meetings take place with the ICT programme directors, which are experienced as very useful by the parties involved. In 2023, plans for starting/stopping training courses, starting/stopping *numerus fixi* and developments in the context of the HCA ICT were discussed by the Ministry of Economic Affairs and Climate Policy. IPN has a good relationship with the HCA-ICT team.

Research schools

The ICT-related research schools, Advanced School for Computing & Imaging (ASCI), Institute for Software Science and Algorithmics (IPA) and School for Information and Knowledge Systems (SIKS) are the research schools that are important to IPN and are special members of IPN. A research school brings together the research and training of researchers in a specific field. The school contributes to the national coordination of research programmes within specific disciplines and has an important role in providing the 'third leg' of the PhD training, namely the professional skills.

Secondary education

IPN participates in the <u>Science Teachers' Chamber</u>, an initiative founded by the <u>Science Deans</u> at the start of the first Science and Technology sector plan due to the shortage of academically trained teachers in the subjects of chemistry, physics, computer science and mathematics. The aim of the Science Teachers' Chamber is to double the intake of university teacher training courses (ULOs) by 2025 for physics, chemistry and mathematics and to fivefold for computer science, compared to 2017-19. There is an IPN representative in the Science teacher's room.

I-Partnership

IPN is also in close contact with the <u>I-Partnership</u> initiative, in which government and educational parties are connected through internships, field labs, PhD positions and many other forms of collaboration on themes such as information management, cyber security, AI and software development. IPN is a member of the I-Partnership steering group. A core activity is setting up I-doctoral programmes.

2.4   Proposal for IPN courses

In 2023, the IPN board expressed the wish to set up two courses, a junior and senior course. The target group of the senior course is potential or new department heads, potential or new IPN directors and professors with national influence (or who aim to have that). The target group of the junior course are ambitious university lecturers with at least several years of experience, novice university lecturers and tenure trackers who are expected to be able to develop into academic leaders in the future. With these courses, IPN aims to improve the administrative position of computer science and to better prepare computer scientists for important tasks. The senior course hopes to contribute to a well-organised and strongly represented ICT-field. Computer science is a young discipline with relatively few seniors. The course aims to ensure that people are well prepared for administrative tasks. The junior course comes from the same idea but is aimed at a younger target group. With this course we hope to empower young, talented researchers and help them position computer science.

3   IPN groups

3.1   Equity, Diversity and Inclusion in computer science

A special initiative is the IPN Equity, Diversity and Inclusion (EDI) Working Group that strives to improve equality, diversity and inclusion in the academic Dutch ICT community. The group organizes concrete actions and events in this area and actively discusses EDI-related topics with policy makers, ICT department heads and other relevant stakeholders.

The working group, which includes representatives from all Dutch universities, CWI and NWO, meets four times a year. In 2023, the working group organised the fourth edition of the annual Alice & Eve meeting on 27 October 2023 in Amsterdam. This event aims to honour and bring together women studying and working women in computer science. The one-day event includes keynote lectures, a poster competition and an exhibition on women in computer science. The working group also released a report in 2023 with tips & tricks and do's and don'ts to create a more inclusive environment for LGBTIQ+ students in ICT, which was enthusiastically received by the academic ICT-field and beyond. The booklet "Why would I want to do a PhD in computer science?" published at the end of 2023 is also available. A collection of the sometimes-circuitous career paths of people who completed their PhD around five years ago was received with great enthusiasm.

3.2   Ethics in computer science

The aim of the IPN Ethics Working Group is to provide a platform for sharing information and knowledge about the different ethics committees that already exist or are being established within the various ICT-departments in the Netherlands. In recent decades, the global research community has become increasingly aware of the responsibility researchers bear when conducting human research. This ethical awareness spans a variety of disciplines, including contemporary technical disciplines such as computer science. In 2023, this group has been refocusing on better embedding the subject of ethics in ICT.

3.3   ICT-Next Generation

The ICT-Next Generation (ICTng) group is a network of assistant and associate professors who exchange experiences and ideas, define common interests, work on common roadmaps for ICT-research and education in the Netherlands, and jointly shape the national and international ICT agenda to influence. The aim of creating these multidisciplinary liaisons is to continue to make an impact in the coming decades because the field knows how to find each other and actively collaborate. In 2023, ICT-Next Generation was closely involved in activities that were (co-) organised by IPN.

3.4   Special Interest Groups

Since 2016, various IPN Special Interest Groups (SIG's) have formed around current themes:

- Data Science Platform Nederland (DSPN)
- Dutch National Association for Software Engineering (VERSEN)
- Special Interest Group Artificial Intelligence (SIGAI)
- Special Interest Group Cyber Security (SIGCS)
- Future Computer Systems and Networking (FCSN)

The SIG's meet frequently and keep a finger on the pulse of the rapidly developing respective research areas. Traditionally, they provide much of the content of the different tracks at ICT.OPEN, the annual event that brings scientists from all ICT-research disciplines and industries together to learn, share ideas and network.

In addition, they are (co-)organisers of annual events such as The 3rd VERSEN Workshop on Programming Languages in the Netherlands PNPL 2023 in Amsterdam (Versen), the computer science conference designed to showcase the success stories of Dutch Computer Systems research CompSys 2023 in Soesterberg (FCSN) and Joint international science conferences on AI and Machine Learning, BNAIC 2023 in Delft (SIGAI). The SIGCS is affiliated with ACCSS as a working group in the ACademic Cyber Security Society (ACCSS). SIGCS has encouraged its supporters to set up thematic working groups under ACCSS. In the past year this has led to the "Hardware & Cyber Physical Systems Security" working group, and recently (in December 2023) to the "Software Security" and "AI and Security" working groups.

4   Knowledge sharing and dissemination

IPN manifests itself through the activities that the platform undertakes. This includes collecting, recording and sharing current knowledge and information with supporters and bringing together researchers, teachers, students, producers, users and policy makers to improve knowledge and skills about ICT research.

4.1   ICT with Industry

IPN is closely involved in the annual organisation of ICT with Industry, a workshop that focuses finding innovative solutions for scientifically challenging, innovative commercial business cases. NWO organizes this workshop together with the Lorentz Center. The aim is to stimulate collaboration and knowledge exchange between science and industry. Scientists and researchers from both academia and industry work together for a week to find original solutions to challenging industrial problems. The teams consist of PhD students and postdocs from research institutions and universities throughout the Netherlands. Each team has a company representative and senior researcher to ensure progress and scientific quality. During the week-long workshop, participants make contact with the industry by working on a business case. The research challenge is discussed with the company and the team looks for a solution.

Cases that have been developed in 2023 in the Lorentz Center in Leiden are:
- KB - OCR quality assessment: Beyond ground truth
- VeiligheidNL - Explainable Fall Risk Predication for Elderly People
- Textmetrics - Gender Bias Detection in Job Ads
- RTL - Automatic Trailer Storyline Generation

4.2   ICT.OPEN Evening Event

In collaboration with NWO and Platform PRIO, IPN brings together scientists from all ICT-research disciplines and industry to learn, share ideas and network. The conference took place on 19 & 20 April 2023 in the Beatrix Theater, Jaarbeurs Utrecht. IPN traditionally provides the Evening Event as a fixed part of the conference. During the Evening Event, IPN informs members and additional guests about developments within academic ICT-research in the Netherlands and invites them to contribute their thoughts. IPN also discusses the recent challenges that ICT-research and the field have faced and the expected challenges in the coming years.

In 2023, ICT.OPEN hosted more than 60 presentations, 95 posters and 26 demos showing the best and most exciting ICT developments. In addition to the IPN evening, on 19 April five interactive sessions were held on a wide range of topics and on 20 April the scientific program concluded with an awards ceremony. In addition, a total of 515 participants had the opportunity to visit presentations from four renowned *keynotes speakers*, Gail Murphy (University of British Columbia), Harry Buhrman (QuSoft), Jos De Groot (Ministry of Economic Affairs & Climate Policy), and Omar Niamut (TNO).

4.3   Dutch Prize for ICT-research (ICT Prize)

The prestigious Dutch Prize for ICT-research (ICT Prize) is awarded annually to a scientific researcher, with maximum of 15 years after their PhD at the time of the decision, who has conducted innovative research or is responsible for a scientific breakthrough in ICT. The ICT Prize has been made available from 2023 onwards by IPN members (with the exception of Wageningen University & Research) with a subsidy from COMMIT/. The selection procedure is conducted by the Royal Dutch Society of Sciences and Humanities (KHMW) and contractually agreed upon with all parties. Jury regulations for the ICT Prize were also drawn up in 2023.

In 2023, Dr Cristiano Giuffrida, associate professor at the Systems and Network Security Group of the VU Amsterdam, received the ICT Prize for his exceptional achievements in the field of research into (solutions for) vulnerabilities in computer systems in general and his important scientific breakthrough in the field of hardware vulnerabilities in particular.

Giuffrida received his prize during ICT.OPEN. In addition to the prize money of €50,000 that has been made available to the winner for his research, an educative video has been produced with accessible explanations about the awarded work. The aim of this video is to reach a wide audience of (potential) students and provide straightforward insights into the challenges of ICT-research.

4.4   I/O Magazine

In 2023, IPN's I/O Magazine was published four times. The various editions paid attention to many current events and facts in the ICT-field. These included take-home messages from the keynote speakers at ICT.OPEN2023 Gail Murphy and Harry Buhrman about software complexity and quantum computations, the constant role and ongoing evolution of three ICT companies. research schools, the fight for more female students, developments in the Hybrid Intelligence programme, international cooperation, bits and bites from space and the cybersecurity call for digital resilience.

December 2023   October 2023   July 2023   April 2023

4.5   IPN digital

In 2023, IPN launched the IPN website, which has been slightly modified and modernised in terms of look and feel. By the end of 2022, the navigation options for visitors has been better structured. The site was evaluated during the strategic IPN board meeting at the end of 2023 and there are plans for a more intensive use of this digital communication tool in the future.


IPN YouTube Channel

An IPN YouTube Channel was also be set up in 2023 on which IPN-related videos were posted, such as the videos of the ICT Prize winners.
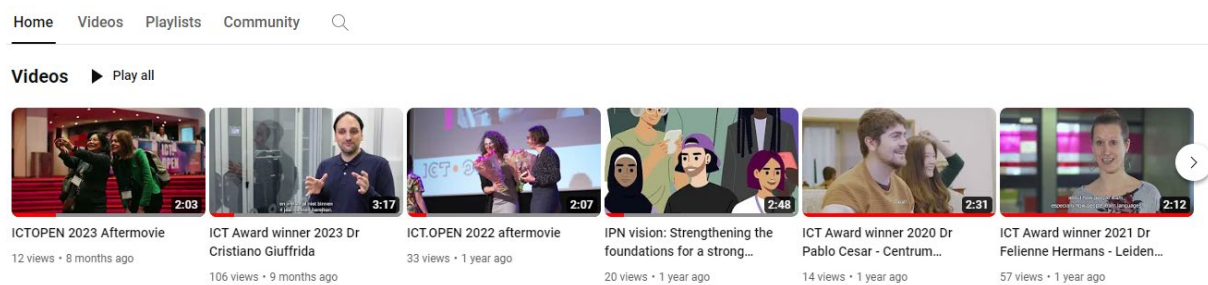
IPN LinkedIn profile

The IPN LinkedIn profile was started at the end of 2023. In addition to mentioning IPN-related information in the NWO newsletter, this profile has been used specifically to distribute IPN-related messages.
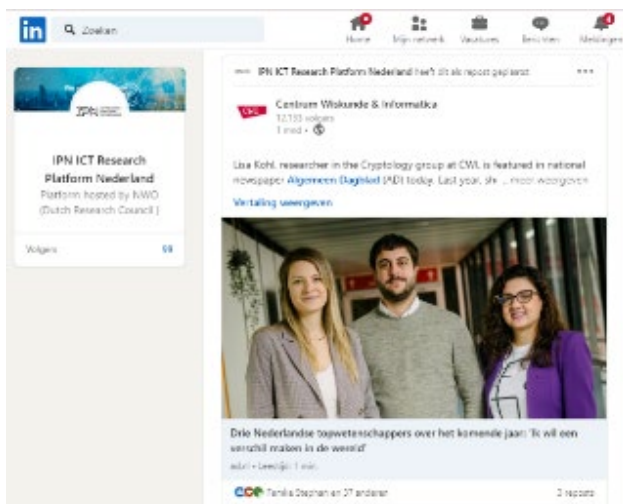
5 IPN-board and members

5.1 IPN board

In 2023, the IPN board met six times. The 2023 meeting dates were 27 January, 10 March, 15 May, 6 July, 11 September and 10 November.

At the end of 2023, the IPN board consisted of the following members:
- Catholijn Jonker, TU Delft/Leiden University (chair)
- Marieke Huisman, University of Twente
- Andy Pimentel, University van Amsterdam
- Gerard Barkema, Utrecht University
- Han La Poutré, CWI/ TU Delft

Changes in IPN board

In January 2023, Patricia Lago left, and Marieke Huisman joined the IPN board. As a result of this some changes were made in the board members portfolios.

5.2 IPN members

IPN has a membership meeting four times a year, in which all universities, NWO and CWI (ordinary members) are represented. The meeting dates in 2023 were 21 March, 13 June, 26 September and 12 December.

The IPN members at the end of 2023 are:

- University of Amsterdam (Alfons Hoekstra and Theo Gevers)
- Vrije University Amsterdam (Koen Hindriks and Jaap Heringa)
- University Leiden (Todor Stefanov and Nele Mentens)
- Technical University Delft (Arie van Deursen and Alan Hanjalic)
- University of Tilburg (Marie Postma and Richard Starmans)
- Technical University Eindhoven (Johan Lukkien and Bettina Speckmann)
- Utrecht University (Johan Jeuring and Anja Volk)
- Radboud University (Lejla Batina and Arjen de Vries)
- University Twente (Geert Heijenk and Giancarlo Guizzardi)
- University of Groningen (Paris Avgeriou and Rineke Verbrugge)
- Maastricht University (Rachel Cavill and Mark Winands)
- CWI (Nanda Piersma and Peter Boncz)
- Wageningen University (Bedir Tekinerdogan)
- Open University (Bastiaan Heeren and Tanja Vos)
- NWO (Femke Stephan and Loes van Bree)

Changes in the IPN membership in 2023
- In February 2023 Giancarlo Guizzardi from the University of Twente joined due to Marieke Huisman's participation in the IPN board.
- Until July 2023 NWO secretary of IPN was Esther Vleugel. She is succeeded by Loes van Bree.
- Todor Stefanov from Leiden University became a member in September 2023 following the death of Harry Wijshoff.

5.3   Extraordinary IPN members

In addition to regular members, IPN also has Extraordinary IPN members. Extraordinary IPN members represent additional organisations active in the ICT-field, that want to remain involved and are willing to develop joint activities. Extraordinary IPN members are also invited to two of the four general membership meetings.

Extraordinary IPN members are:

- The Advanced School for Computing and Imaging (ASCI)
- Cyber Security Special Interest Group (SIGCS)
- Data Science Platform Nederland (DSPN)
- Dutch Techcentre for Life Sciences (DTL)
- Future Computer Systems and Networking (FCSN)
- ICT-Next Generation (ICTng)
- The Institute for Programming research and Algorithmics (IPA)
- Netherlands e-Science Center (NLeSC)
- Platform computer science Education Netherlands (PION)
- Platform Mathematics Nederland (PWN)
- Special Interest Group AI (SIGAI)
- Netherlands Research School for Information and Knowledge Systems (SIKS)
- SURF
- TNO
- Dutch Association for Logic and Philosophy of the Exact Sciences
- Dutch National Association for Software Engineering, VERSEN

Changes in the IPN Extraordinary membership
- Accession of the Platform for Informatics Education Netherlands (PION) in September 2023

6   Finances IPN

The Dutch Research Council (NWO) supports IPN *in kind* with personnel and administration.

Activities	Budgeted	Expenditure
ICT-Prize 2023	€ 55.000	€ 55.279
I/O Magazine	€ 60.000	€ 63.737
IPN other	€ 15.000	
- IPN website		€ 433
- ICT.OPEN2023 Evening Event		€ 6.813
- ICT with Industry		€ 2.000
- Development courses		€ 3.872
- Meeting costs		€ 216
IPN EDI working group	€ 5.000	€ 2.865
Total	€ 135.000	€ 135.215