Personalised medicine is currently at an inflection point. There’s been much discussion around genomics, AI and data, but we are now at a point where a number of factors are coming together to make it a reality. We found a great deal of interest in X-omics at last years’ event and the discussion around how we combine all of the omics data continues. The volume and variety of data, computing power and AI technology allow us to precisely discover and identify patient populations who will respond to a drug and deliver personalized therapies. What role can this data and AI play in drug discovery and, indeed even with all the incredible research, and tech, are there regulatory, financial, political or ethical barriers which hold us back? There is much ground to cover before we truly realise the potential of precision medicine.

As such, for 2019 we will have more speakers, covering more content, more opportunity to engage with your peers, showcases of novels technologies and so much more.

As the precision medicine movement takes a firmer grip, we will look at the latest data analysis technologies, how AI is transforming the way we think about therapies, the benefit of X-omics; how it is coming to the fore and becoming the norm for everyday methodology for researchers. We will uncover the issues surrounding regulation and what is being done to break down the barriers to nationwide adoption of a personalised approach to medicine.

We hope to see you in Utrecht for what promises to be an unrivalled forum for the region.

Speakers include:

- **Prof Dr Alain van Gool**, Professor Personalized Healthcare, Head Translational Metabolic Laboratory, Radboud university medical center
- **Prof Dr Frank Rademakers**, Chief Medical Technology and Innovation Officer, University Hospitals Leuven, Belgium
- **Oliver Gassner**, Head Digital Health Intelligence EMEA, Bayer
- **Prof Dr Dick Willems**, Department of General Practice, Section of Medical Ethics & Co-Leader of the Personalised Medicine Programme, Amsterdam Medical Centre

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DAY 1 Programme - Monday 13 May, 2019

12.15 Registration and Lunch

13.00 Opening remarks from the Chair

Piarella Peralta, Patient Advocacy Lead, Diaceutics Precision Medicine
Connective & Patient Advocate, Inspire2Live

13.10 Exploring the Future Direction of Precision Medicine: What We Hope to Achieve and Required Next Steps

A panel of expert speakers from across the Benelux region will share their views on what has been achieved to date in the implementation of precision medicine, where they believe it is heading in the near future; and where the focus needs to be in order to achieve key aims and objectives. Topics to be discussed include:

- Examining key advancements and enablers in the development and implementation of precision medicine
- Identifying the current legal, regulatory, societal and ethical obstacles restricting its further development
- Assessing how regulatory and healthcare frameworks in different countries need to adapt to overcome these obstacles and enable innovation and delivery
- What can be done to improve reimbursement pathways for precision medicine to encourage better collaboration between regulators and health technology and diagnostic test providers?

Panellists:

Prof Dr Dick Willems, Department of General Practice, Section of Medical Ethics & Co-Leader of the Personalised Medicine Programme, Amsterdam Medical Centre

Prof Dr Csica Wijnenga, Professor of Human Genetics, University Medical Centre, Groningen

Prof Dr Folkert Asselbergs, Professor of Cardiovascular Genetics, UMC Utrecht and Professor of Precision Medicine, University College London

Anouk Waeytens, Pharmaceuticals Expert & Project Manager Personalized Medicine, RIZIV-INAMI

The presentations will be followed by an in-depth panel Q&A discussion; delegates are invited to ask questions and share their own views.

15.05 Short Comfort Break

15.15 The Role of Molecular Pathology in Precision Medicine: Challenges and Possibilities

Prof Dr Ed Schuuring, Professor in Molecular Oncological Pathology, Senior Clinical Scientist in Molecular Pathology, University Medical Center Groningen

15.35 Leveraging Digital Data & Biomarkers to Enable Precision Medicine

Oliver Gassner, Head Digital Health Intelligence EMEA, Bayer

15.55 From EMIF to EHDEN – Scaling Up the Big Data Ecosystem Across Europe

Nigel Hughes, Scientific Director, Janssen Clinical Innovation

16.35 Refreshments & Networking

17.00 Delegates move to their chosen break-out session

17.05 Interactive Break-Out Sessions

These focused, interactive sessions give you the opportunity to discuss a key topic of interest to you in a more participative format. Each session will be led by a facilitator who will lead the discussion and encourage maximum debate and sharing of ideas.

A. FAIR Genomes Interactive Session: What Does FAIR Mean to You?

What does FAIR mean to you? Is the central question for this session. Which data would you like to use, for what purpose and under what conditions? This interactive session is specifically designed for those who wish to have a say in how genome data are generated, stored, shared and (re-) used. Representatives from the FAIR Genomes project will provide a snapshot of the genome data landscape in the Netherlands, its background, and its outlook. Participants will then use an interactive approach to explore and discuss the many aspects of FAIR, with the aim of generating input to the national guideline and corresponding harmonization tools that will be developed.

Dr Marielle van Gij, Laboratory Geneticist Clinical Genetics, Dept of Genetics, University Medical Centre, Utrecht

Dr Jeroen Beliën, Associate Professor, Dept of Pathology, Amsterdam UMC, Vrije Universiteit Amsterdam

Dr Terry Vrijenhoek, Staff and Faculty Advisor, Dept of Genetics, University Medical Centre, Utrecht

B. Pharmacogenetics in Clinical Practice: Hurdles to Overcome & Challenges to Solve

In this workshop, challenges encountered in clinical practice in the implementation of pharmacogenetics will be discussed, such as the degree of quality control needed, ethical aspects, legal issues, SNPs to analyse, pros & cons of specific DNA genotyping approaches, how to report, who to inform on the outcome of test results, insurance company aspects, the role of the GP and specialist, role of the pharmacist, patient empowerment and how to deal with new insights in the field.

Prof. Dr. Ron HN van Schaik, Professor of Pharmacogenetics, Erasmus University Medical Center

C. X-Omics: Integrating Molecular-Omics Technologies to Gain New Insights and Advance Precision Medicine - Prevention, Diagnosis and Treatment

Prof Dr Alain van Gool, Professor, Personalized Healthcare & Head, Translational Metabolic Laboratory, Radboud UMC

D. Harnessing the Potential of Big Data for Precision Medicine

Dr Rianne Fijten, Senior Scientist, Maastro Clinic, Maastricht University

18.10 Closing remarks from the Chair followed by Complimentary Networking Drinks Reception

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DAY 2 Programme - Tuesday 14 May, 2019

08.30 Welcome Refreshments & Networking

9.00 Opening Remarks from the Chair
Prof Dr Eric Sijbrands, Professor of Vascular Medicine, Dept. of Internal Medicine, Erasmus MC, Rotterdam

9.05 Keynote address: Advancing Personalised Medicine Across Europe: Priorities & Opportunities
Manuel Mateo Goyet, Cabinet Member of Mariya Gabriel, Commissioner for Digital Economy & Society, European Commission

9.30 Translational X-Omics Diagnostics to Drive Personalised Healthcare
• Increasing need for personalized diagnostics to drive precision medicine
• Examples of clinical impact through diagnosis using X-omics biomarkers
• Fast translational biomarker implementation in clinical laboratories
• View on next generation X-omics technology and integration
Prof Dr Alain van Gool, Professor Personalized Healthcare, Head Translational Metabolic Laboratory, Radboud university medical center

9.50 Translating Biological Research & Big Data into Actionable Insights for Use in Clinics
• Exploring how the journey from research to implementation could be accelerated
• Integrating technology with existing healthcare databases to give better patient knowledge and insight
• Getting big data into clinical decision support frameworks: how can the flow of health data be facilitated?
• Exploring how broad genomic profiling can be turned into valuable information that can be used quickly and easily for patients’ benefit in clinics
Prof Dr Harald Schmidt, Professor & Head of Department of Pharmacology & Personalised Medicine, Faculty of Health, Medicine & Life Science, Maastricht University

10.10 Bringing Precision Medicine to the Next Level
Dr James Creeden, International Medical Director, Foundation Medicine Inc.

10.25 Q&A

10.40 Morning Refreshments & Networking

The programme will now split into 2 tracks. Delegates are invited to choose the track they would like to attend.

**TRACK ONE**
Leveraging the Power of "Big Data" in Precision Medicine

One of the biggest challenges to advancing precision medicine is managing the huge volumes of data being created. Appropriate bioinformatic methods for managing, integrating, sharing and analysing complex biological data are required to enable reinforcement of commonalities, reduction of “noise” and identification of the right clinical result.

Chair:
Dr Stefan Willems, Associate Professor & Head Molecular Pathology, Dept of Pathology, UMC Utrecht

11:10 Data Sharing: Effectively Managing the Legal, Technical and Ethical Obstacles to Data Sharing
• Understanding actual vs perceived barriers to the sharing of genomic and health data
• Working with relevant stakeholders to influence and overcome these barriers
• Examining the extent to which the introduction of GDPR has impacted on the accessing and sharing of healthcare data, and how this can be managed
• Managing patient privacy and confidentiality concerns regarding healthcare data sharing
• Effectively linking patient e-health records and national

**TRACK TWO**
Biomarker Development & Diagnostics

A recognised bottleneck in the advancement of precision medicine is the identification, development and validation of appropriate predictive biomarkers. These are a vital tool to provide the link between research, clinical trials and implementation. This session will look at the future development of biomarkers, how their use in clinical practice can be improved and facilitated, as well as emerging diagnostic techniques for better disease prediction and prognosis.

11:10 A Supporting Ecosystem to Mature Extracellular Vesicle-Associated Biomarkers into Clinical Application
Prof Dr An Hendrix, Laboratory of Experimental Cancer Research, Department of Human Structure and Repair, Ghent University

11.30 Developing Pharmacogenomic Biomarkers for Personalised Drug Therapy
Prof. Dr. Ron HN van Schaik, Professor of Pharmacogenetics, Erasmus University Medical Center

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data registers to establish a research database and facilitate shared decision-making

- Exploring the use and potential of blockchain-based data sharing and access

Dr Mahsa Shabani, Interfaculty Centre for Biomedical Ethics & Law, KU Leuven

11.30
Data Integration: Overcoming the Challenges of Integrating Large Volumes of Complex Data from Heterogeneous Sources

- Exploring new methods for integrating genetic data that is from different sources, in different formats, processed in different ways:
  - finding the meaningful overlap and reducing "noise"
  - techniques for normalising the data
- Successfully integrating lifestyle and behavioural data with biological information
- Developing robust, transparent and standardised bioinformatic pipelines to provide timely and useful clinical information
- Using new data analysis tools to gain better insights from the information available
- Techniques for reporting the findings in a coherent way: encouraging closer interactions between bioinformaticians and clinicians for better clinical reporting

Prof Dr Peter-Bram t’Hoen, Professor of Bioinformatics & Head, Centre for Molecular and Biomolecular Informatics (CMBI), Radboud University Medical Centre

11.50
Translation of Multi-Omics Data into P4 Medicine for Rare Diseases

Dr Clara van Karnebeek, Principal Investigator, Departments of Paediatrics and Clinical Genetics, Emma Children’s Hospital, Academic Medical Centre, Amsterdam

12.10
Integration of Multi-Cellular and Multi-Layered Immune Cell Data to Stratify Rheumatological Diseases

- Stratification/reclassification of patients with clinically defined rheumatological diseases
- Integration of multi-cellular OMICS data generated from immune cell profiling
- Systems Immunology: from proof-of-concept to translational research

Dr Aridaman Pandit, Assistant Professor, Laboratory of Translational Immunology, University Medical Center Utrecht (UMCU)

12.30
Q&A Discussion

12.50-13.45
Networking Lunch

11.50
Robust and Cost-Effective Monogenic Noninvasive Prenatal Diagnosis by Targeted Haplotyping and Targeted cfDNA Sequencing

During pregnancy, cell-free DNA (cfDNA) in maternal blood encompasses a small percentage of cell-free fetal DNA (cffDNA), an easily-accessible source for determination of fetal disease status in risk families through non-invasive procedures. In case of monogenic heritable disease, background maternal cfDNA prohibits direct observation of the maternally inherited allele. Non-invasive prenatal diagnostics (NIPD) of monogenic diseases therefore relies on parental haplotyping and statistical assessment of inherited alleles from cfDNA, techniques currently unavailable for routine clinical practice. Here, we present Monogenic NIPD (MG-NIPD), which requires a blood sample from both parents, for Targeted Locus Amplification (TLA)-based phasing of heterozygous variants selectively at a gene of interest. Capture probes-based targeted sequencing of cfDNA from the pregnant mother and a tailored statistical analysis enables predicting fetal gene inheritance. MG-NIPD was originally validated for eighteen pregnancies, focusing on the CFTR gene, the CYP21A2 gene, and HBB. In all cases we could predict the inherited alleles with >98% confidence, even at relatively early stages (8 weeks) of pregnancy. This prediction and the accuracy of parental haplotyping was confirmed by sequencing of fetal material obtained by parallel invasive procedures. MG-NIPD requires standard instrumentation and promises to provide families carrying a severe genetic disease with a robust and affordable methodology for non-invasive diagnosis based on a simple blood draw. We will present our current efforts to implement MG-NIPD in the clinic, eventually to replace invasive procedures for assessment of inheritance of monogenic diseases.

Prof Dr Wouter de Laat, Professor in Biomedical Genomics, Hubrecht Institute-KNAW & University Medical Centre Utrecht

12.10
Examining the Development of Microbiome-Related Biomarkers

- Examining the emerging research into associations between the human microbiome and disease
- Understanding how individual host-microbiome associations can be integrated with other "omics" data to develop precision medicine approaches

Prof Dr Jingyuan Fu, Associate Professor, Department of Paediatrics & Department of Genetics, University Medical Centre Groningen

12.30
Q&A Discussion

12.50-13.45
Networking Lunch
TRACK THREE
Harnessing the Potential of E-Health & Digital Technologies to Advance Precision Medicine

New digital and machine-based technologies have the capability to revolutionise healthcare and drive precision medicine forward through more efficient patient-monitoring, real-time diagnoses, faster drug development, and more. This session will look at the application of new health-tech and digital developments; the benefits they are realising and the challenges to their further adoption.

Chair:
Jan-Eric Slot, Council to the Board & CIO Advisory, Bernhoven Hospital

13.50
Examining How E-Health and Patient Self-Management are Instrumental for Improving Healthcare Outcomes
This session will provide insight into how a tailored digital coaching programme can support self-management of the patient:

• Outlining how self-management level might give an indication of future health outcomes
• Sharing experience with telemonitoring and what important factors to take into account when implementing e-health solutions and telemonitoring programmes

Frank Valk, Medical Consultant, Population Health Management, Philips VitalHealth

14.10
Personalized and Precise Medicine using Machine Learning
Exploring how machine learning can facilitate the development of decision support tools, based on the analysis of large volumes of routine care data. This presentation, using a case study example, will demonstrate how, by combining machine learning with medical expertise, the expected outcomes can be determined.

Michael de Neree tot Babberich MD, PhD Candidate, Amsterdam UMC & Product Owner, Pacmed

14.30
Examining Machine Learned Prediction of Treatment Benefit in Cancer
This presentation will discuss our work on gene expression classifiers. Firstly, addressing the challenge of ensuring classifiers are amenable to interpretation to obtain insight into biological processes that play a role in cancer initiation and progression. Secondly, exploring how one can obtain classifiers that predict treatment benefit to enable precision medicine.

Dr Jeroen de Ridder, Principal Investigator & Associate Professor, Center for Molecular Medicine, UMC Utrecht

14.50
Q&A

15.10
Afternoon Refreshments & Networking

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TRACK FOUR
Advancing Precision Medicine Through Multi-Omics Strategies

Genomics studies still contribute the vast majority of precision medicine-based data. However, it is now recognised that this is not enough, and so a new generation of -omics technologies is allowing assessment of the whole body-narrative. Taking a systems medicine approach and examining multiple -omics, using information from the genome, proteome, metabolome and transcriptome to identify critical drivers and pathways of disease, and the uniqueness of each human being, will be increasingly used to develop personalised medicine strategies.

13.50
Proteomics: Towards Personalized Proteome Profiling
Prof Dr Albert Heck, Professor of Biomolecular Mass Spectrometry and Proteomics, Utrecht University

14.10
Metabolomics: Developing Strategies for Metabolomics-Driven Systems Biology to Enable Personalised Medicine
Prof Dr Thomas Hankemeier, Principal Investigator, Analytical Biosciences & Metabolomics & Chair, Systems Biomedicine and Pharmacology Division, Netherlands Metabolomics Centre, Leiden University

14.30
Exploring the Role of Epigenomics in Diseases
Since chemical modifications of DNA or histones are reversible processes, there is potentially a huge benefit in modulating such modifications for the treatment of human cancers using pharmacological drugs. To achieve such anti-cancer therapy, it is essential to decipher the molecular mechanisms underlying epigenetic and epigenomic perturbations in tumours. We will present our recent efforts, to better understand and map epigenetic alterations in cancers, including DNA methylation and hydroxymethylation.

We will also discuss about our very recent work on an emerging realm of biological regulation, termed RNA epigenetics. We will present our ongoing attempts to decipher the roles of RNA modifications in cancer.

Prof François Fuks, Director, Laboratory of Cancer Epigenetics & ULB-Cancer Research Center (U-CRC), ULB - University of Brussels

14.50
Q&A

15.10
Afternoon Refreshments & Networking

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Achieving the Effective Implementation of Precision Medicine into Clinical Practice

Chair:
Prof Dr Eric Sijbrands, Professor of Vascular Medicine, Dept. of Internal Medicine, Erasmus MC, Rotterdam

15.35
Physician's Perspective: Using Precision Medicine Research in Practice for Patients' Benefit

Prof Dr Martina Cornel, Professor of Community Genetics & Public Health Genomics, VU University Medical Centre & Principal Investigator Genomics Applications, Centre for Society and the Life Sciences

15.55
Managing the Implications of Precision Medicine Advancement for Healthcare Systems

• Examining the impact on the healthcare professional (HCP) and their role:
  - how do HCPs need to adapt to deliver the healthcare of the future?
  - effectively managing increasing patient empowerment
• Communicating and convincing HCPs of the validity and potential of new personalised treatments and therapies
• Assessing the infrastructure, data and technology changes required to current healthcare systems in order to deliver a precision medicine approach
• Developing and implementing precision medicine training programmes for healthcare professionals

Prof Dr Frank E. Rademakers, Chief Medical Technology Officer, University Hospitals Leuven
Dr Tessel Rigter, RIVM - National Institute for Public Health and the Environment, Center for Health Protection & Amsterdam UMC, Vrije Universiteit Amsterdam, Clinical Genetics, Section Community Genetics, Amsterdam Public Health Research Institute

16.40
Q&A Discussion

17.00
Closing Remarks from the Chair & Close of Conference

A Final Plenary Session will Conclude the Afternoon
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