



DOTliveplanetarium



**university of
 groningen**

**faculty of science
 and engineering**

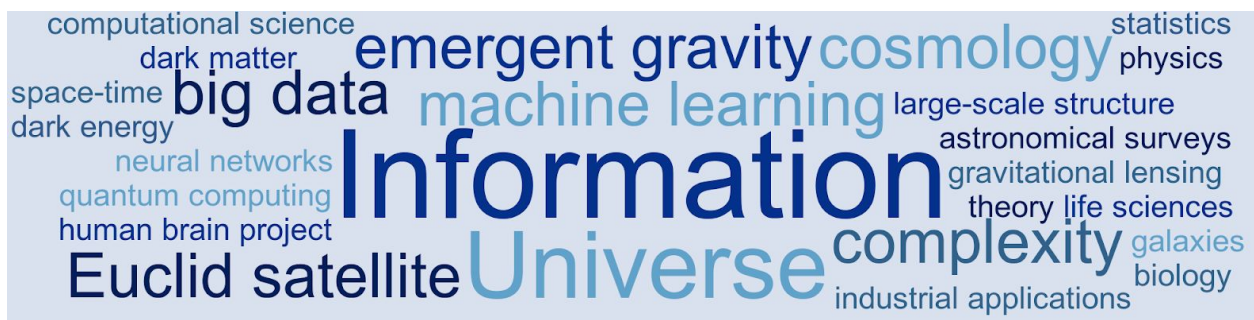
Website: www.informationuniverse.rug.nl

The second Information Universe conference 3-6 July 2018

The key topic of the IU conference series is: "What is the role of information in the Universe and its description?". In an epoch where scientists need to handle Big Data and simulations, find highly organized systems in nature and grapple with the role of information in physics and other sciences, this appears to be one of the more fundamental questions that needs to be answered in order to understand the world around us. The Information Universe conference intends to unite various approaches, addressing the fundamental role of information both in nature ("in vivo") and in data analysis, theory and computer modelling ("in vitro").

The conference will approach the key role of information from the point of view of several disciplines: e.g. cosmology, physics, mathematics, life sciences, computer science (including quantum computing) and neuroscience. The deeper role of information is formulated in different ways by these various disciplines, leading to a multitude of fundamental questions such as:

- Is there a deeper physical description of space-time based on information?
- What are the consequences of quantum mechanics for cosmology?
- Will quantum systems dominate the future of computing?
- How do our numerical simulations and Big Data repositories (in vitro) differ from real natural system (in vivo)?
- What is the role of information in highly organized complex life systems and genetics?
- What will be the role of machine learning in the future of science?
- How will information guide us in understanding fundamental cosmological problems: dark matter, dark energy, inflation and structure formation?
- What is the deeper meaning of the information paradox at the Black hole horizon?
- Is the universe one big information processing machine, a hologram, one of many?



To address these questions, the conference will host sessions on:

- **Emergent space-time and gravity**
Keynote speaker: Erik Verlinde
- **Euclid, cosmology and large-scale structure**
Keynote speaker: Alan Heavens, *Invited speaker:* Alessandra Silvestri
- **Quantum information & quantum computation**
Keynote speaker: Lieven Vandersypen
- **Machine learning** (including industrial applications)
Keynote speaker: Larry Wasserman
- **Information, complexity & handling big data** (including applications)
Keynote speaker: Peter Sloom, *Invited speaker:* Giuseppe Longo
- **Life science and biology**
Keynote speaker: Karlheinz Meier
- **Information and the Theory of Everything**
Keynote speaker: Thanu Padmanabhan

In addition there will be (at least) one public evening, and a panel discussion at the end of the conference.

The conference will be held in the 260 seater planetarium theatre in Groningen, which provides an immersive 3D full dome display. This enables speakers to show unique and inspiring visuals, e.g. numerical simulations of the formation of our Universe, the brain in 3D, and anything else that springs from the imagination of the presenters.

For more information and registration, please visit: www.informationuniverse.rug.nl.

Scientific Organizing Committee

Prof. Dr. Eric Bergshoeff (Van Swinderen Institute for Particle Physics and Gravity)

Prof. Dr. Konrad H. Kuijken (Leiden Observatory)

Prof. Dr. Edwin Valentijn (Kapteyn Astronomical Institute)

Prof. Dr. Rien van de Weijgaert (Kapteyn Astronomical Institute)

Local Organizing Committee

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