

Frans M.J. Willems



$$u_c = \frac{g_c + u_{oc} C_{ic}}{Z}$$





Professor

Technische Universiteit Eindhoven

1982 - Present · 38 years

1982 - 1991 assistant professor, 1991 - 2016 associate professor. 2016 – 2020 Full professor



Advisor

Philips Lighting

1999 - 2017 · 18 years

Area Information Theory. From 1999 - 2016 Philips Research. Since 2016 Philips Lighting.



Ph.D. student

Katholieke Universiteit Leuven

Jul 1979 - Jun 1982 · 3 years

Ph.D. student at the Department of Mathematics. Supervisor: Prof. Edward C. van der Meulen.
Research Area: Multi-User Information Theory.



Education



Eindhoven University of Technology

Ingenieur · Electrical Engineering

1972 - 1979

Master-thesis supervisor was Prof.dr.ir. J. Pieter M. Schalkwijk, subject: Information Theory.



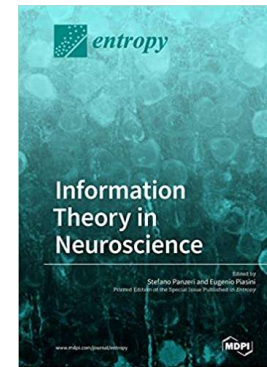
1978: Frans wanted to do a master thesis in „the Brain and Information theory,“ but....(it was too early)

- 2020 Neuroscience is a hot topic (a lot of financial support)

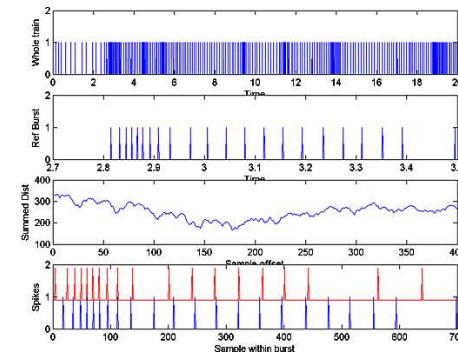
A Tutorial for Information Theory in Neuroscience

Nicholas M. Timme and Christopher Lapish

eNeuro 29 June 2018, 5 (3) ENEURO.0052-18.2018; DOI: <https://doi.org/10.1523/ENEURO.0052-18.2018>



- Example: Estimating entropy from empirical samples of finite size is of central importance for information theory as well complex statistical systems.



he did something else

HET CAPACITEITSGEBIED VAN
EEN TWO-WAY CHANNEL.

J.P.M. Schalkwijk

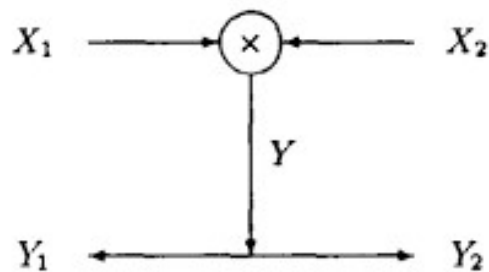


Fig. 6. Binary multiplying channel.

is there a solution?

	0	1
0	0	0
1	0	1

F.M.J. Willems.

Verslag van het afstudeerwerk
verricht in de groep
Informatie- en Communicatietheorie.
Mei 1979,
Technische Hogeschool Eindhoven.
Coach :
Prof.Dr.Ir.J.P.M. Schalkwijk.



worden. In dit verslag wordt aangetoond dat voor een bepaalde klasse van TWC's, namelijk die TWC's met slechts één output, het capaciteitsgebied gelijk is aan het inner bound gebied. Uitgaande hiervan wordt er een nieuwe upper bound



Frans his first important international conference: ISIT 1979, Grignano (Italy) - meeting Günther Dück – Rudi Ahlswede

- G. Dueck, The capacity region of the two-way channel can exceed the inner bound, Inform. and Control **40** (1979), no. 3, 258--266; MR 81i:94009



It “was” a difficult problem!

But, Frans found a way out: from two-way to multiple access in Leuven

Thesis Dr. Frans Willems (1982)

- *Information-theoretical Results for the Discrete Memoryless Multiple Access Channel*

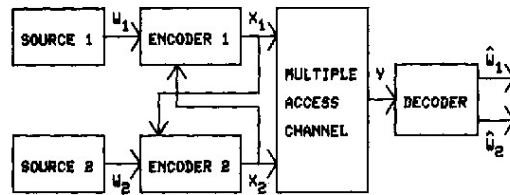
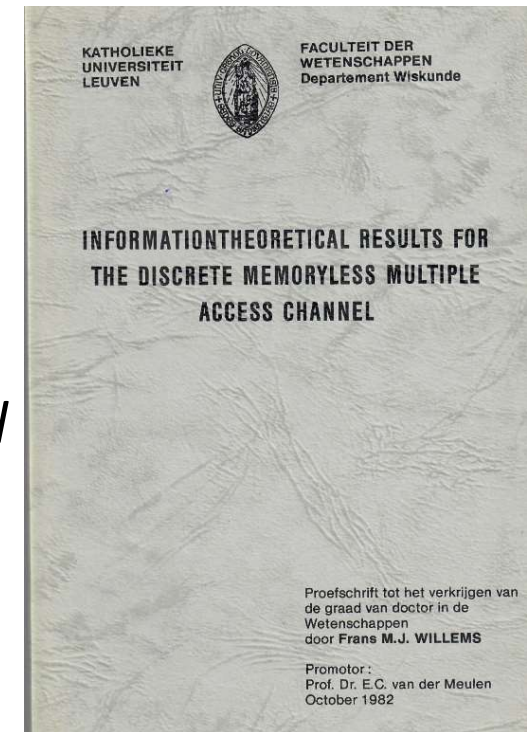


Fig. 4. Both encoders crib.



- PhD thesis, Katholieke Universiteit Leuven, Belgium, Oct. 1982.
 - Supervisor: Edward van der Meulen

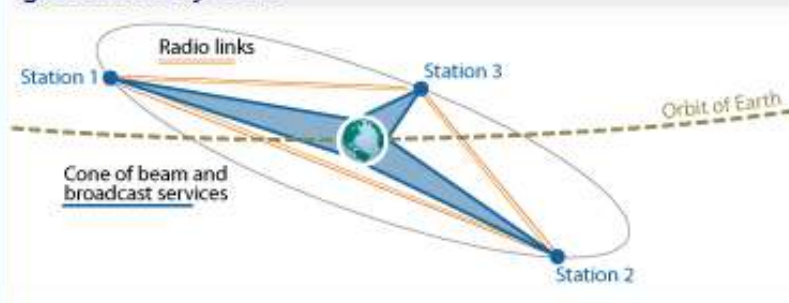


A good start of his career!

- mmv Prins Claus in de ridderzaal

The Marconi award for Arthur Clarke

Figure 1 — In his paper of 1945, Clarke illustrated how the entire globe could be covered by three satellites in geostationary orbit



Marconi Young Scientist Award '82 voor Willems



Vrijdag 11 juni jl. heeft ir. Frans Willems in de Haagse Ridderzaal de Marconi Young Scientist Award 1982 uit handen van mevrouw Gioia Marconi Braga in ontvangst genomen. Ter herdenking van de 100ste geboortedag van de grote Italiaanse uitvinder Marconi werd in 1974 door zijn dochter Gioia Marconi Braga de Marconi International Fellowship ingesteld. Die prijs werd uitgereikt aan Arthur C. Clarke, terwijl de onderscheiding voor Jonge Onderzoekers dus gewonnen werd door THE-ingenieur Willems (zie ook TH-Berichten nr. 36). Sinds de instelling van de Marconi Prijs is de Fellowship Award jaarlijks toegekend en de Young Scientist Award is pas aan drie Jonge Onderzoekers uitgereikt. Frans Willems, die per 1 juli a.s. in dienst treedt van de THE, noemde in zijn dankwoord deze onderscheiding een stimulans om op de ingeslagen weg door te gaan.

Work at TUE from 1983 - 2021: Vakgroep EI (Piet Schalkwijk)

- 1981 Norwich (Nato)
 - Good speakers, long boat trip
- 1983 IEEE ISIT in St. Jovith
 - New York, Niagara
 - Trip from St. Jovith to NY
- 1985 ISIT in Brighton
 - Shannon was a participant



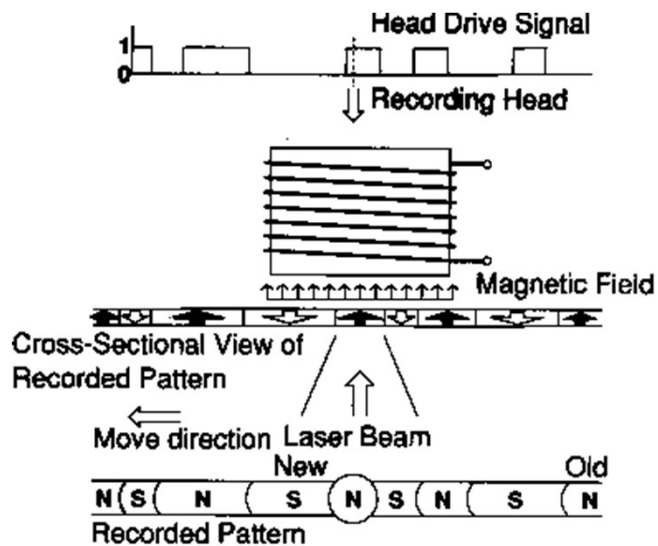
Joint work

- Write Unidirectional Memory
 - (the Walhalla - Baggen code)

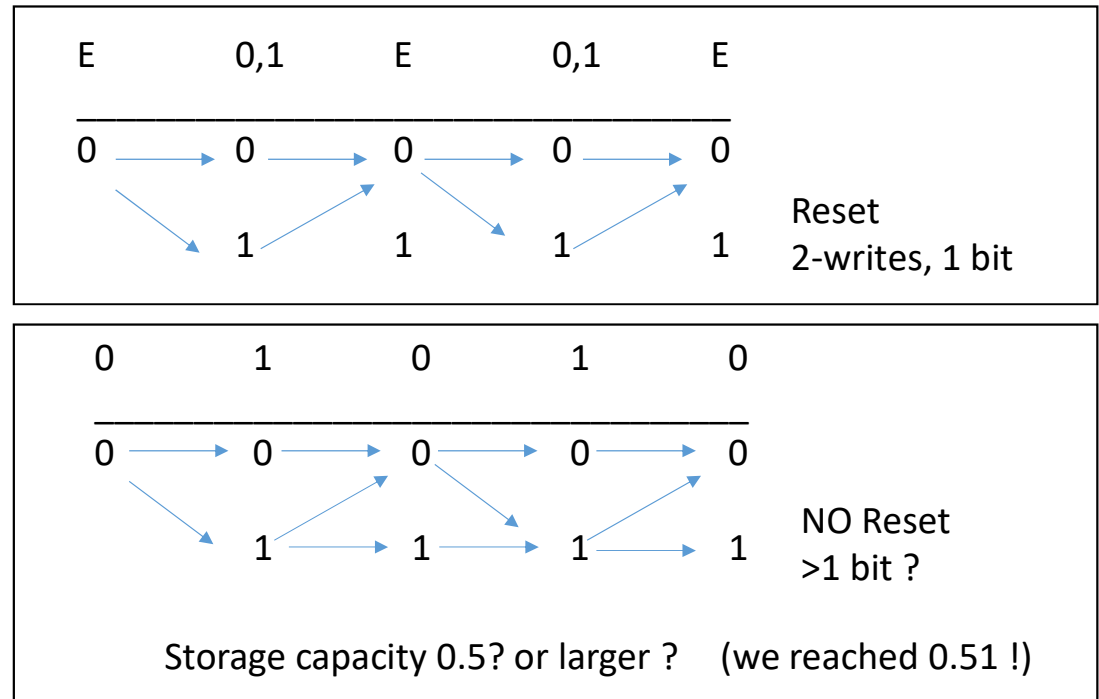


References

- [1] S. Baggen (Philips Research Laboratories, Eindhoven, The Netherlands), private communication (December 1985).
- [2] F.M.J. Willems & A.J. Vinck, "Repeated recording for an optical disc," *Proc. 7th Symp. on Information Theory in the Benelux*, Noordwijkerhout, The Netherlands, May 22-23, 1986. Ed. by D.E. Boeke, Delft University Press, 1986, p. 49-53.



Sony minidisk



The Schalkwijk (EI) group



Frans, Piet, Harry, Tjalling, Han, Jan en Joop

Two research highlights

- IEEE IT society Best paper award (1996)
 - with Yuri Shtarkov and Tjalling Tjalkens
- IEEE Signal processing society Best paper award (2009)
 - with Tanja Ignatenko

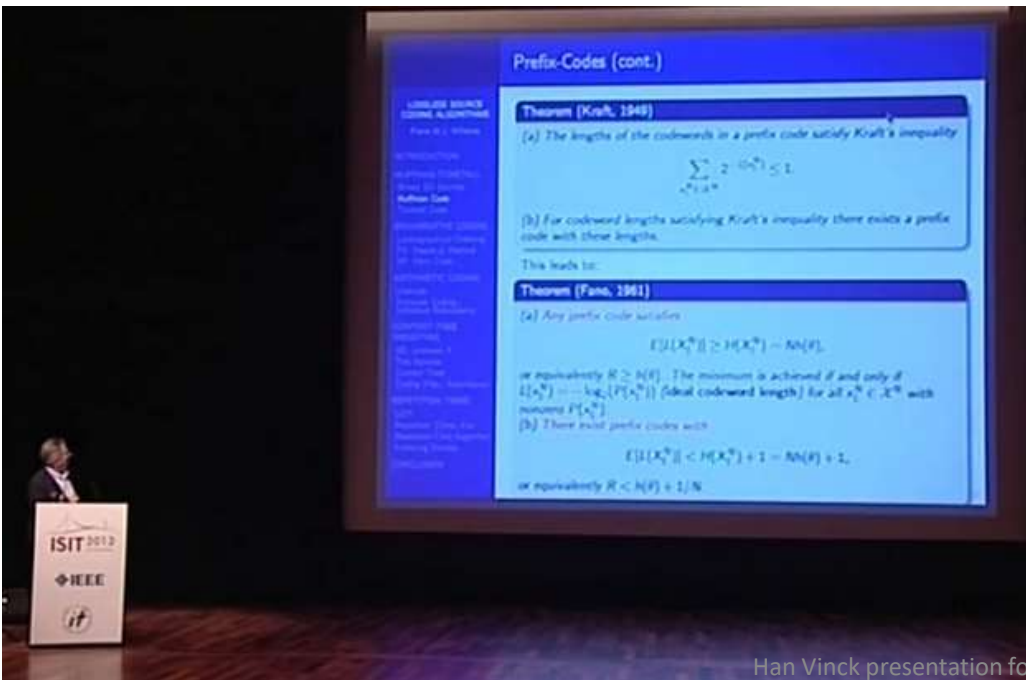


BEST PAPER AWARDS

Tanya Ignatenko and **Frans M. J. Willems** for the paper entitled, "[Biometric Systems: Privacy and Secrecy Aspects](#)," published in the *IEEE Transactions on Information Forensics and Security*, Volume 4, Number 4, December 2009.



Plenary speaker ISIT Istanbul 2013



Frans M.J. Willems: Lossless Source Coding Algorithms

The research of Frans in pictures

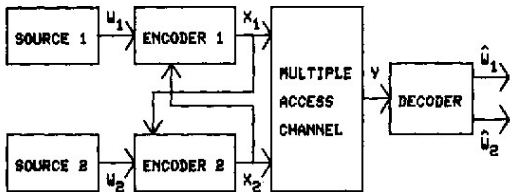


Fig. 4. Both encoders crib.

J.P.M. Schalkwijk

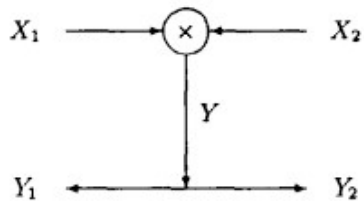
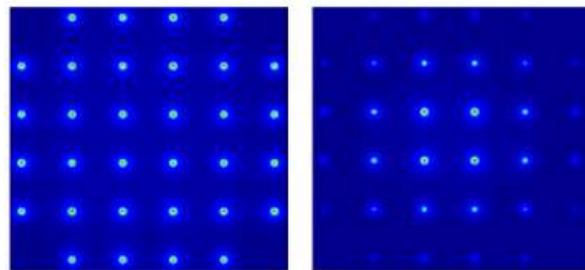
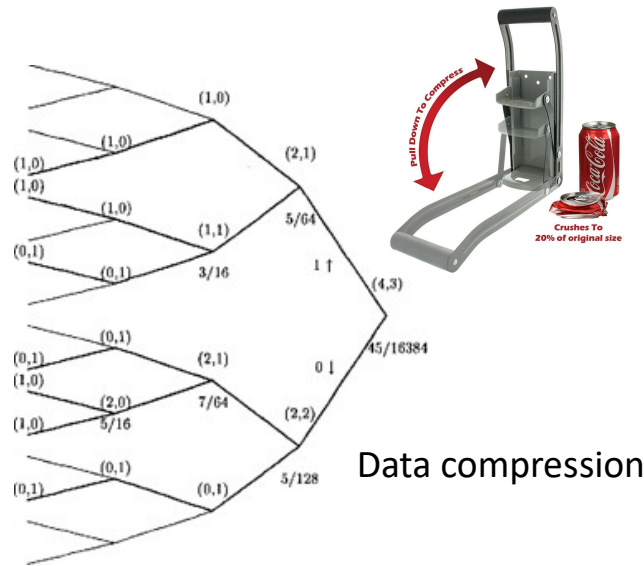


Fig. 6. Binary multiplying channel.

Two way and Two-access



shaping



Biometrics, PUF

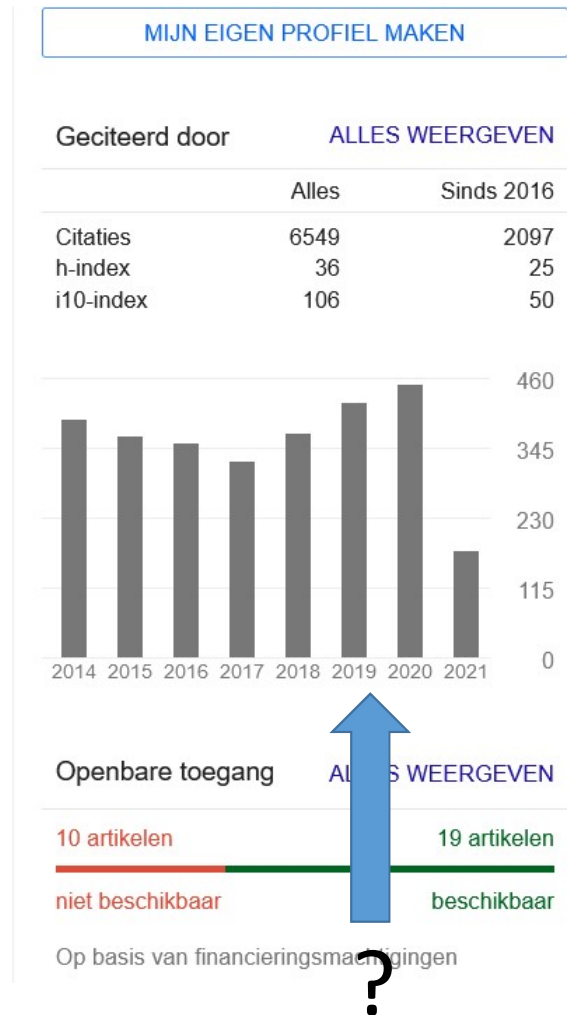


publications? => our private joke!

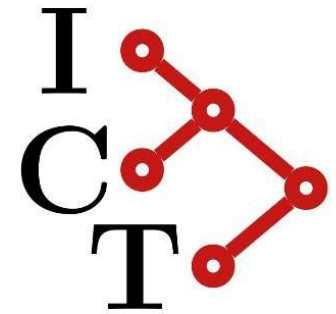


Another mark on ...

Celebrated with:



A new inspiring environment?



international recognition: IEEE fellow 2006



- *IEEE Fellow is a distinction reserved for select IEEE members with extraordinary accomplishments in any of the IEEE fields of interest*
- Every year about 300 new fellows from 450.000 members (0.7/1000)
- Title: For contributions to multi-user information theory.

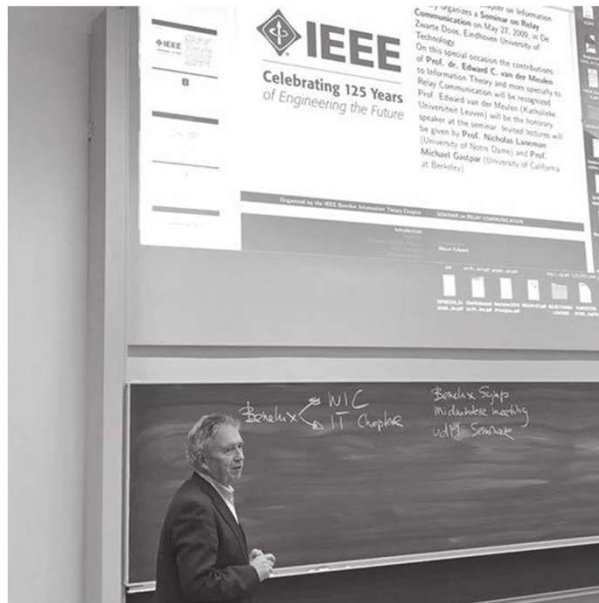


Activities for the (IEEE) scientific community

- Associate Editor for Shannon Theory for the IEEE Tr. on Information Theory from 1988 to 1990
- Associate Editor for Information Th. for the European Tr. on Telecomms. from 2002 to 2006.
- From 1998 to 2000, member of the Board of Governors of the IEEE Information Theory Society
- Counselor of the IEEE Student Branch Eindhoven from 2007-2014
 - IEEE outstanding Branch Counselor award!
- Chairman of the IEEE Benelux Chapter on Information Theory from 2007 to 2017.



Organizer of scientific meetings at TUE



Not only scientific: IEEE Women baking contest, 2013



Han Vinck presentation for Frans Willems - Nov 2021

Best chapter of the year award (Barcelona, 2016)



Han Vinck presentation for Frans Willems - Nov 2021



Jasper Goseling
Frans Willems (Counselor)
Jos Weber



Celebration 100 jaar Shannon, 2016 Frans is an invited speaker



Han Vinck presentation for Frans Willems - Nov 2021

We changed a bit, or may be more?

- Niagara **1983**, after St. Jovith, Cnd.
- **2018**, TU München (at Gerhard Kramer's group)

<https://www.ei.tum.de/events-2018> ▼ [Vertaal deze pagina](#)

2018 Munich Doctoral Seminar on Communications (MSC)

Han Vinck (Univ. Duisburg-Essen) Prof. **Frans M.J. Willems** (TU Eindhoven). TUM



Frans: “Information is driving our society”

- I want to understand how information should be
 - gathered,
 - protected,
 - communicated,
 - stored,
 - processed,
 - and used in the best possible way.



Prost Frans ! THANKS

- for the great efforts
- contributions to Inf. Th. Science
- collegiality
- friendship
- look back at a great career!



and for the future?



Many happy years with Monique!



Han Vinck presentation for Frans Willems - Nov 2021

Frans en Piet Schalkwijk, 2019



Han Vinck presentation for Frans Willems - Nov 2021

Some colleagues in 1978



Frans



Jack Aarts



Stan Baggen

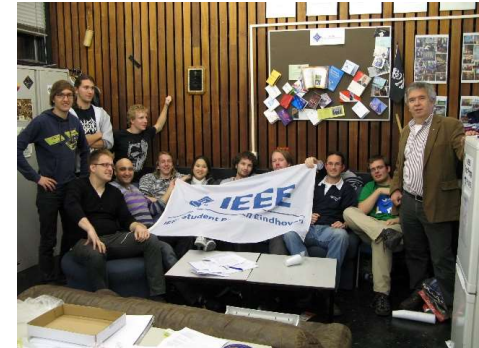


Loe Feijs



Jean Kleijnen

Frans active with the students in Eindhoven



Han Vinck presentation for Frans Willems - Nov 2021

2021 van der Meulen Seminar in Honor of Prof. Frans Willems

Save the date for the 2021 van der Meulen Seminar in honor of Prof. Frans Willems, Friday, November 5, 2021 at Eindhoven University of Technology.

Save the date for the 2021 van der Meulen Seminar in honor of Prof. Frans Willems.

Title: "Van der Meulen Seminar in honor of Frans Willems".

Venue: Corona Hall, TU/e, Eindhoven.

Date: Friday, November 5, 2021.

The preliminary program includes the following speakers:

- Dr. Pim Tuyls, CEO Intrinsic ID
- Prof. Gerhard Kramer, Technical University of Munich
- Prof. Jean-Paul Linnartz, Signify (Philips Lighting)
- Prof. Liesbet Van der Perre, KU Leuven
- Prof. Ioannis Kontoyiannis, University of Cambridge
- Prof. Frans Willems, Eindhoven University of Technology

More Information

Event Date


 Nov 5, 2021

[Add to Calendar](#)

Event Location

 Eindhoven University of Technology

Contact Name

 Alex Alvarado

Event URL