



Hendrik Ferreira 1954 - 2018

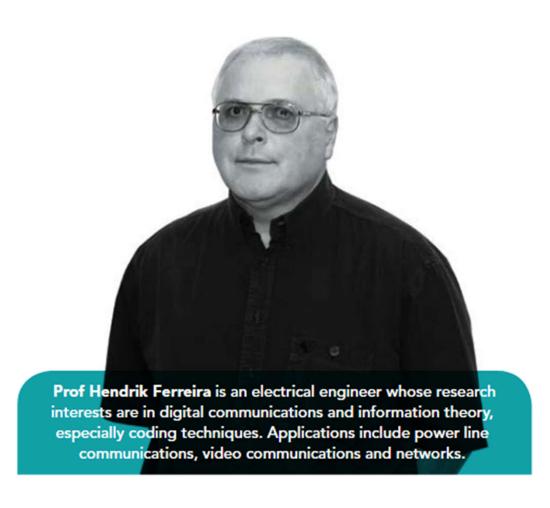
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Hable con ella: Pedro Almodóvar,

Hendrik loved film music!

https://www.youtube.com/watch?v=bJSWsX-bDBI

Hendrik Ferreira passed away 30 November 2018



Short CV of Hendrik

- PhD 1980, University of Pretoria
 - Visiting researcher, Linkabit(QualComm), San Diego, 1980-1981
 - consulting engineer, GHM, Pretoria, South Africa, 1981-1983
- Started 1983 at Rand Afrikaanse Universiteit RAU (white)
 - Where he became full professor 1989
 - Presidential award for young researchers Foundation Research and Development, Pretoria, 1989
- Transition RAU to University of Johannesburg, 1993 (black)







- Special status as research professor, 2007
- NRF award 2013: A-Rating as "Leading International Researcher."
- 2014, Vice-Chancellor's Distinguished Award for Outstanding Researcher of the Year







Master Thesis from Pretoria, 1976





Eerste ry (van links na regs): Mnr. H. F. J. STRYDOM; mnr. W. SMIT; mnr. J. J. D. VAN SCHALKWYK; mnr. C. A. J. KRITZINGER; prof. F. G. HEYMANN (Dept. Hoof); mev. N. LIEBENBERG; prof. J. RIBBENS; prof. P. RADEMEYER; mnr. G. L. BREDENKAMP; mnr. J. L. M. PRETORIUS; mnr. J. P. ZEEMAN.

Tweede ry: J. A. VILJOEN; J. A. DE KOSTER; F. J. RICHTER; D. VAN WYK; mnr. M. DU PLESSIS; mnr. B. VAN DER MERWE; mnr. G. T. MESSEMAKER; mnr. P. M. WRIGHT; mnr. P. VAN DER ZWAN; W. C. BREYTENBACH; B. H. COETZER; F. D. JOUBERT; B. T. VAN

Derde ry: J. C. H. STEYL; J. A. PRETORIUS; J. G. GREEF; M. N. ENGELBRECHT; D. TEN KROODEN; A. J. WOLMARANS; T. P. VAN GRAAN; A. J. VAN DER WALT; L. E. RAUBENHEIMER; P. S. VAN DER WESTHUIZEN: K. L. NELL.

Vierde ty: S. M. FERREIRA; A. A. WILLIAMS; H. D. MOUTON; F. GRASHOF; E. VAN DER MERWE; J. F. REYNECKE; J. F. LA GRANGE;
A. L. GROBLER; P. S. CREMER; P. L. D. ABREOL J. G. DREYER; F. P. SOTHEALA

Vyfde ty: P. J. CILLIERS; H. C. FERREIRA; S. J. LOUW, A. J. JOUDERT; M. P. NOVELLIE; J. C. ODENDAAL; A. D. LYNN; J. F. A. MARITZ; P. S. BEZUIDENHOUT; F. ANDERSON; J. S. SMIT.

INLAS: prof. N.WESSELS: prof. L. VAN BILJON: mor. E. VAN DEN WIJNGAERD: G.J.E. VILJOEN.

Hendrik's main research interests

Constrained sequences: Example: 000 – 111 forbidden



- On dc free magnetic recording codes generated by finite state machines,
 HC Ferreira, IEEE transactions on magnetics, 1983,
- Markers to construct DC free (d, k) constrained balanced block codes using Knuth's inversion
 HC Ferreira, JH Weber, CH Heymann, KAS Immink Electronics Letters, 2012
- Insertion/deletion codes: Example: 1011001 = > 101001
 - On multiple insertion/deletion correcting codes
 ASJ Helberg, <u>HC Ferreira</u> IEEE Transactions on Information Theory, 2002
 - Insertion/deletion detecting codes and the boundary problem
 F Palunčić, KAS Abdel-Ghaffar, HC Ferreira IEEE Trans. on Information Theory, 2013
- Powerline communications: see next page



PLC research areas (with many students)



Step-by-step design of a coupling circuit with bi-directional transmission capabilities,
 PAJ Van Rensburg, <u>HC Ferreira</u> - Proc. of 8th ISPLC-2004, Zaragoza, Spain, 2004



Coding



On combined spectral shaping coding and M-FSK modulation for power line communications, K Ouahada, <u>HC Ferreira</u>, L Cheng, AJH Vinck - **ISPLC 2005**

<u>Permutation trellis codes</u>, <u>HC Ferreira</u>, AJH Vinck, TG Swart, I de Beer - IEEE Transactions on Communications, **2005**

VLC – PLC

Inter-building PLC-VLC integration based on PSK and CSK techniques,
 AR Ndjiongue, HC Ferreira, T Shongwe, ISPLC 2016



Modeling

Broadband and Narrow-Band Noise Modeling in Powerline Communications,
 T Shongwe, <u>HC Ferreira</u>, AJ Han Vinck, Wiley Encyclopedia of Electrical and Electronics Engineering, 1-18, 1999

PLC research areas (continued)

Noise (Impulse)

- Selected subcarriers QPSK-OFDM transmission schemes to combat frequency disturbance,
 VN Papilaya, T Shongwe, AJH Vinck, <u>HC Ferreira</u> ISPLC 2012 (best paper award)
- A study on impulse noise and its models, T Shongwe, AJH Vinck, HC Ferreira SAIEE Africa Research Journal, 2015

Smart Grid

- Noise generated by modern lamps and the influence on the smart-grid communication network, A Emleh, AS de Beer, <u>HC Ferreira</u>, AJH Vinck - 2015 IEEE International Confere on Smart Grid Communications
- Consumer preference electricity usage plan for demand side management in the smart grid,
 OM Longe, K Ouahada, <u>HC Ferreira</u>, S Rimer SAIEE Africa Research Journal, 2017

Automotive

 Automotive power-line communications: Favourable topology for future automotive electronic trends, PAJ Van Rensburg, <u>HC Ferreira</u> - Proceedings of the 7th ISPLC, 2003

3 highlight contributions/papers

• HC Ferreira, "Lower bounds on the minimum Hamming distance achievable with run length constrained or dc free block codes and the synthesis of a (16,8) dmin = 4 dc free block code," IEEE Transactions on Magnetics, vol. MAG-20, no. 5, Sept. 1984, pp. 881-883.

This often cited paper gave an existence proof for combined additive error correcting and constrained codes. It opened a new research topic in Information Theory, stimulating the publication of more than 100 research papers.

• HC Ferreira and A.J. Vinck, "Interference cancellation with permutation trellis codes," Proceedings of the IEEE Vehicular Technology Conference Fall 2000, September 24-28, 2000, Boston, MA, USA, vol. 5, pp. 2401 – 2407.

In this paper a long existing open problem in mathematics was solved, namely finding a generalized construction for permutation arrays with good Hamming distance properties. The solution involves the application of Hendrik Ferreira's algorithm for distance preserving mappings to sets of integer permutations.

• HC Ferreira, KAS Abdel-Ghaffar, L Cheng, TG Swart and K Ouahada, "Moment Balancing Templates: Constructions to Add Insertion/Deletion Correction Capability to Error Correcting or Constrained Codes," IEEE Trans. on Inf. Theory, Volume 55, No. 8, August 2009, pp. 3494 – 3500.

This paper is a recent example of the largest body of publications on coding techniques for correcting insertions/deletion corrections, which is due to Hendrik Ferreira and his students. It is shown that by using a small amount of redundancy, comparable to that of a Hamming code, insertion/deletion correction capability can be added to any error correcting or constrained block code.



Hendrik C Ferreira



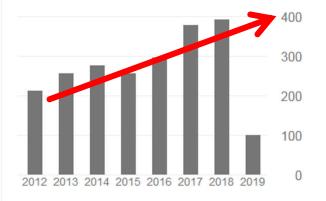
Professor of Electrical and Electronic Engineering Verified email at uj.ac.za

Digital Communications Information theory Powerline Communications Channel Coding

TITLE	CITED BY	YEAR
Power line communications: theory and applications for narrowband and broadband communications over power lines HC Ferreira, L Lampe, J Newbury, TG Swart John Wiley & Sons	579	2011
Power line communications: an overview HC Ferreira, HM Grove, O Hooijen, AJH Vinck Proceedings of IEEE. AFRICON'96 2, 558-563	186	1996
Markov characterization of digital fading mobile VHF channels F Swarts, HC Ferreira IEEE Transactions on Vehicular Technology 43 (4), 977-985	111	1994
On multiple insertion/deletion correcting codes ASJ Helberg, HC Ferreira IEEE Transactions on Information Theory 48 (1), 305-308	107	2002
Permutation trellis codes HC Ferreira, AJH Vinck, TG Swart, I de Beer IEEE Transactions on Communications 53 (11), 1782-1789	87	2005
Power line communication HC Ferreira, HM Grové, O Hooijen, AJ Han Vinck Wilev Encyclopedia of Electrical and Electronics Engineering	85	2001

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Cited by		VIEW ALL
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Citations	3591	1700
h-index	26	16
i10-index	85	40



Co-authors



Book on Powerline Communications

 Power Line Communications - Theory and Applications for Narrowband and Broadband Communications over Power Lines,

Editors: H.C. Ferreira, L. Lampe, J. Newbury, and T.G. Swart,

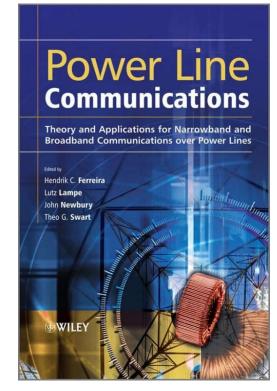
Wiley and Sons, Ltd., June 2010.



Overview:

Power line communication

HC Ferreira, HM Grové, O Hooijen, AJ Han Vinck Wiley Encyclopedia of Electrical and Electronics Engineering (2001)



His favorite place: the office at UJ









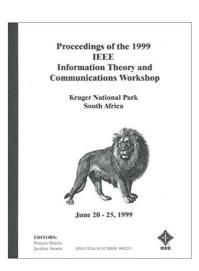
Important organized international meetings

IEEE Workshop Information Theory 1999, Kruger Park





With entertainment



• 1st IEEE Winterschool on Information and Communication Theory in Africa, 2010

2nd AFRICAN WINTER SCHOOL ON INFORMATION THEORY AND COMMUNICATIONS

in News

2nd AFRICAN WINTER SCHOOL ON INFORMATION THEORY AND COMMUNICATIONS August 16–21, 2015 Protea Hotel Kruger Gate Skukuza, South Africa





Important organized international meetings

ISPLC 2013



Future directions in Information Theory and Communications, 2015





Some reactions from colleagues abroad

- Emina Soljanin: President IEEE IT society
 - I new Hendrick for a long time, and was very fond of him.
- Daniel Costello: Book Lin Costello + ...
 - He was the leading coding theorist in South Africa for many years and a long time member of the IT Society
- Bella Bose: Collegue and co-tennis plaer
 - please convey my deep respect to Hendrik
- Werner Henkel: University Bremen
 - ein wirklich netter Kollege
- Stefano Galli:
 - I remember his gentle and polite character.
- Ralf Lehnert:
 - Das ist eine sehr traurige Nachricht. Hendrik verkörpert für mich den bescheidenen, aber gründlichen Wissenschaftler, der sehr viel für seine Mitarbeiter und die Fachkollegen getan hat.
- Frans Willems:
 - he gave us the opportunity to get to know South Africa a little bit.
- Khaled Abdel-Ghaffar:
 - Hendrik was the one who gathered all of us and I feel sad not to be in his last gathering.
- Sanjeevikumar Padmanaban
 - We lost the wonderful personality and advisor.
- Luca Tallini:
 - the scientific community has lost an excellent researcher.
- Jos Weber
 - Generous ... modest ... smart ... kind
- Andrea Tonello:
 - very sad and unexpected news
- Ulrich Speidel
 - The links he built for you and for us are what will live on long beyond his passing, and they will be a pleasure to keep alive.
- Ivan Fair
 - Hendrik was a scholar, and friend, who touched so many of us all around the world.
- Chris Yelland
 - an academic of the highest standing on the global stage, and a human being of the greatest integrity.

Some personal remarks



Characteristics

- He was always searching for topics for his PhD students (notebook)
 - some names:





<u>Theo Swart</u>, Khmaies Ouahada, Allen Emleh, Ling Cheng, <u>Reolyn Heymann</u>, Piet Janse van Rensburg, W. Clarke, F. Paluncic, Jaco Versveld, Thokozani Shongwe, Albert Helberg,

L. Botha, Francis Swarts, Pieter van Rooijen, Richard Ndjiongue, Abe Snijders ...

- With an eye for practical applications
- Persistent, but always modest
- Conservative, he wanted to keep the past (see research, car, friends, ...)
- Hendrik was a researcher for 40 years under difficult circumstances (SA)
 - Isolated, money, political, social, personal, ...
- With many longstanding international cooperations
 - Kees Schouhamer Immink, Han Vinck, Jos Weber,
 - KAS Abdel-Ghaffar, Sacha Kutznetsov, Ulrich Speidel, ...





Example, look at Hendrik's old car (≈25 years)





Hendrik's passion (Fellow Photograph Society South Africa)

Once we lost him

But found him in Gruyere, 2002



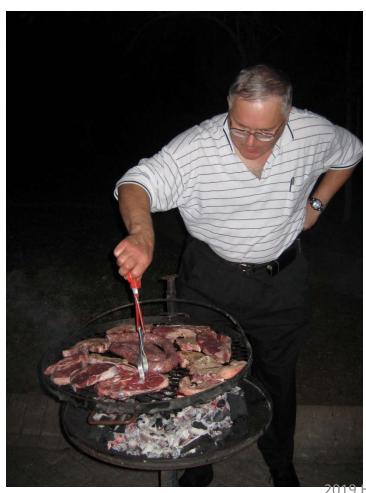


The best of Gelaway CALLERY

2019 Hendrik Ferreira, in memoriam by Han Vinck

Hendrik's speciality)

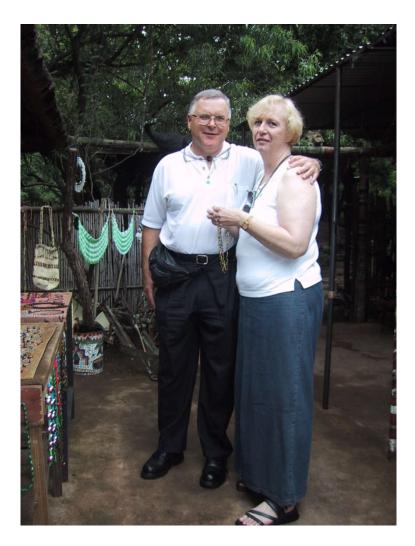






2019 Hendrik Ferreira, in memoriam by Han Vinck

Hendrik and his Hester Potgieter





Hester passed away (2008)

Hendrik and his students



Round table discussion with entrepreneur Pieter van Rooyen: US\$100m, UJ-educated

Hendrik's student.





eira, in memoriam by

23

Hendrik and international conferences,



Hendrik and playing tennis at conferences



<u>Mario Blaum</u>, Almaden IBM. I played tennis with Hendrik many times. I used to be an avid player, but Hendrik always beat me, easily I must say.



Michael Tanner: He was an excellent player, who understood the sublime craftsmanship of a well-constructed point. He rarely went for the flashy shot at the risk of error. Wily placement, controlled pace, consistency, and patience were his subtle weapons. His game adapted well to varied court conditions as a result. Whatever the outcome, one could always count on his integrity and his good will in the game. Winning was of course the goal, but his pleasure at the athletic achievements of a great match and the camaraderie of the game was shared with everyone around him. His wonderful spirit will be sorely missed.



<u>Bella Bose</u>, Oregon state university Michael Tanner and Mario Blaum used to play now and then. But most of the time only Hendrik and I played.

Hendrik and his friends/guests: some pictures, 1994





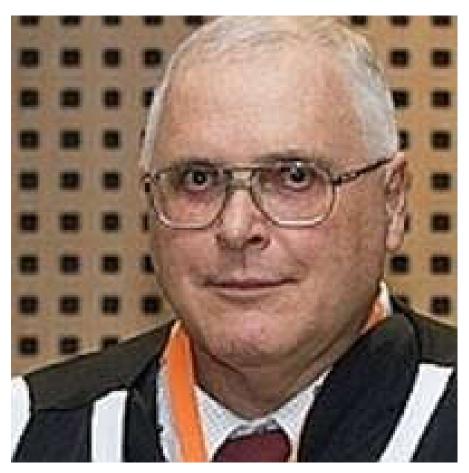




We miss him

Condolences to his family, friends, students, colleagues





https://www.itsoc.org/news-events/recent-news/in-memoriam-hendrik-christoffel-ferreira

Search the silence that inspires





2019 Hendrik Ferreira, in memoriam by Han Vinck

Tribute to Hendrik Ferreira, who passed away in November 2018.



Hendrik Christoffel Ferreira, 1954-2018

Professor Hendrik Christoffel (H.C.) Ferreira (born 1954) passed away on November 30, 2018 after suffering from a wasting disease. He was a Research Professor in the Centre for Telecommunications in the Electrica and Electronic Engineering department of the University of Johannesburg (Previously known as RAU). He started his career at the Rand Afrikaanse University in 1983, where he was promoted to full professor in 1989. He was instrumental in developing a research group on digital communications, with information theory as its center point of focus. Prof. Ferreira has been a pioneering initiator and stimulator of coding for data storage systems such as deletion correcting codes, DC free codes and runlength constrained codes. He was a pioneer in powerline communications. The IEEE Communications Society awarded the 2013 ISPLC Award to him with citation "For his contributions towards Research and Education in Power Line Communications." During 2013, the NRF awarded him the coveted A-Rating for researchers who after independent peer evaluation are recognized by a majority of peers as "Leading international Researcher. In recognition of his excellence in research and educating post-graduate students, he has been appointed as a research professor at the University of Johannesburg in 2007.

Hendrik contributed at the university to the transformation of South Africa from an "apartheid" state into a multicultural nation. In contrast to many other professors, Hendrik stayed in South Africa under difficult circumstances, and his enthusiasm never wavered and he continued to make contributions to our field. To solve the problem of isolation, he invited many foreign scientists to visit the University of Johannesburg and in this way played an important role in creating international projects for his PhD students. Hendrik was the chairman for the 1999 Information Theory Workshop in the Kruger Park, the first Winter School on Information Theory in Africa in 2010, the 2013 International Symposium on Powerline Communications, and many more.

Hendrik was a well respected tennis player at ISIT. His greatest hobby was photography, where he reached a professional level. In 2004 he was awarded the cover photograph of the coffee table book "Getaway Gallery". Hendrik survived his beloved wife Hester by more than 10 years.

29



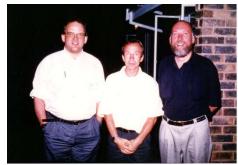












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