

3-PAGE CURRICULUM VITAE

Professor Harald Haas FREng FRSE FIEEE FIET

Private Address:

25 Greenbank Drive
Edinburgh EH10 5RE

Office Address:

Cambridge University
Electrical Engineering Division,
9 J J Thomson Avenue,
Cambridge, CB3 0FA

Mobile: +44(0)7898 728818

Office : +44 (0)1223 748332

Email: huh21@cam.ac.uk

UNIVERSITY EDUCATION AND DEGREES AWARDED

Ph.D. Interference *analysis of and dynamic channel assignment algorithms in TD-CDMA/TDD systems*,
University of Edinburgh, July 2001

Dipl.-Ing. *Comparison of conventional controller with fuzzy controller*, Technische Hochschule Nürnberg
Georg Simon Ohm, Nürnberg (Germany), 1994

CAREER SINCE GRADUATION

04/24 – to date	Van Eck Professor of Engineering, University of Cambridge
01/21 – to date	Visiting Professor, School of Engineering, University of Edinburgh
07/20 – 03/24	Distinguished Professor of Mobile Communications, Electronic & Electrical Engineering, The University of Strathclyde
12/13 – to date	Director of <i>Li-Fi Research and Development Centre</i> , University of Cambridge
01/12 – to date	Founder and Chief Scientific Officer (CSO) for pureLiFi Ltd
08/10 – 07/20	Professor of Mobile Communications, School of Engineering / Institute of Digital Communications (IDCOM), University of Edinburgh.
08/08 – 07/10	Reader, School of Engineering / Institute of Digital Communications (IDCOM), University of Edinburgh.
06/07 – 07/08	Lecturer, School of Engineering / Institute of Digital Communications (IDCOM), University of Edinburgh.
09/02 – 06/06	Associate Professor of Electrical Engineering, School of Engineering and Science, Jacobs University Bremen
02/01 – 08/02	Research Project Manager, Siemens AG / Information & Communication Mobile Networks, Munich (Germany)
05/99 – 01/01	Research Associate, Department of Electronics & Electrical Engineering / Signals and Systems Group, University of Edinburgh
03/99 – 02/00	Consultant, Nokia Networks, Nokia / Oulu
08/95 – 10/97	Engineer, Siemens AG / Semiconductor Division (now Infineon), Munich (Germany)
02/95 – 07/95	Engineer (Heinz-Nixdorf scholar), Siemens AG, Bombay (India)

FUNDING

- £36M total, in research grants as Investigator (Principal Investigator & Co-Investigator) and helped raising \$45M for pureLiFi Ltd.
- Leading the UK Telecoms Hub on the Network of Networks, *Platform Driving the Ultimate Connectivity - TITAN* (EP/X04047X/1), which received a total of £13.83 million from EPSRC (2023-2026). It includes 24 UK partners, including four research institutes, with a total of 45 Co-Investigators and 45 Postdoctoral Research Associates (PDRAs).
- Received an EPSRC Established Career Fellowship, *Tackling the Looming Spectrum Crisis in Wireless Communication* (EP/K008757/1), £1.68m (2012-2017), and an EPSRC Established Career Fellowship Extension, *Towards 100 Gigabit Wireless Networking by Light (Go-by-Light) (Ext.)* (EP/R007101/1/2), £1.3m (2017-2021). Both fellowships have been instrumental in establishing LiFi as a global technology, contributing to the development of the IEEE 802.11bb standard.
- His first EPSRC grant, *Spatial Modulation* (EP/G011788/1), £314k (2009–2012), pioneered spatial modulation technology, which has since inspired over 1,500 papers with "spatial modulation" in the title by numerous research groups worldwide, along with many more papers advancing the new field.

PUBLICATIONS AND PATENTS

- 700 refereed publications (290 Journal articles – including two *Nature* papers and one *Science* paper, 410 international conference papers, 4 popular science papers)
- 3 textbooks published:

- H. Haas and S. McLaughlin, “Next Generation Mobile Access Technologies: Implementing TDD”, Cambridge University Press, 2008
- S. Dimitrov and H. Haas, “Principles of Infrared and Visible Light Communications”, Cambridge University Press, 2015
- H. Haas, M. S. Islam, C. Chen and H. Haas, “An Introduction to Optical Wireless Mobile Communications”, Artech House, 2021
- 7 invited book chapters (including Wiley & Sons / Econ Verlag / Cambridge University Press)
- 45 awarded patents (and more than 34 pending patent applications)
- h-index of 109 according to Google Scholar, and more than 65,000 citations
- Appeared on Thomson Reuters list of Highly Cited Researchers 2017 – 2023
- Invented Spatial Modulation, which is now researched world-wide, and implemented at Orange Labs (France). First journal paper, *IEEE Transactions on Vehicular Technology*, entitled “Spatial Modulation” cited 2739 times (Google Scholar, 15 September 2024).
- Introduced ‘LiFi’ in 2011 in a TED Global Talk; invited *IEEE/OSA Journal of Lightwave Technology* paper: “What is LiFi?” has been among the 100 most downloaded *IEEE* papers

RESEARCH HIGHLIGHTS

- Summary of experimental demonstrations that have shifted boundaries in optical wireless communications:

Achievement	Year
3 Gbps from single blue micro LED	2014
1 Gbps with colloidal quantum dots	2017
15.6 Gbps from discrete red/green/blue/yellow off-the-shelf light emitting diodes arranged to produce a white light beam	2019
1 Gbps from organic light emitting diode (OLED)	2020
1 Gbps received by a single gallium arsenide (GaAs) photovoltaic cell	2020
363 Mbps received by a 2 x 2 multiple-input multiple output (MIMO) organic photovoltaic cells receiver	2021
1.9 Gbps transmitted over 100 m using a deep ultraviolet (UV) micro LED.	2022
5 Gbps received by a single photon avalanche detector (SPAD) array	2022
105 Gbps transmitted by 10 channel wavelength division multiplex (WDM) visible and infrared light system	2022
4 Gbps from OLED	2025

COMMERCIALISATION

- Successfully spun out pureLiFi Ltd. from the Scottish Enterprise-funded proof-of-concept project, D-Light, which Haas led as Principal Investigator. He subsequently founded pureLiFi Ltd. with his former postdoc, Dr Mostafa Afgani, in January 2012. He has helped raise \$45M for the company through multiple investment rounds from both national and international firms, including the Singaporean firm Temasek. He is currently the Chief Scientific Officer (CSO) and a non-executive Director of pureLiFi. The company employs 45 people and generates multi-million-pound revenues annually.
- Supported pureLiFi Ltd. in standardising LiFi within the Institute of Electrical and Electronics Engineers (IEEE) Local Area Wireless Networks Working Group, 802.11. pureLiFi initiated and chaired the new IEEE 802.11bb LiFi standard, which was published in November 2023.
- Initiated the LiFi Research and Development Centre (LRDC) in December 2012 and has led it since, generating six patent families and supporting industry to build an eco-system and drive adoption of LiFi; Kyocera SLD Laser winning the SPIE Prism Award in 2023 for a collaboration with the LRDC.
- LRDC is founding member of the Light Communication Alliance (LCA)

ENGAGEMENT AND COMMUNICATION

- BBC Radio 4 Interview by Professor Jim Al-Khalili FRS – “The Life Scientific” 25 April 2023
- Appearance in several international media channels such as BBC, NPR, CNBC, New York Times, Wired UK, NewScientist, The Economist, Financial Times, CNN International, Forbes.
- TIME Magazine listed LiFi as one of “The 50 Best Inventions” in TIME Magazine, November 2011, <https://time.com/archive/6640671/the-50-best-inventions/>.
- Haas is one of a few people in the world who have been invited to TED Global twice:

- He first coined 'LiFi' in 2011 - talk "Wireless data from every light bulb" has been watched more than 2,808,000 times
- His second TED talk "Forget Wi-Fi. Meet the New Li-Fi Internet" has been watched more than 2,933,000 times.

AWARDS

- Recipient of Alexander von Humboldt Research Award from the Alexander von Humboldt Foundation in Germany. This award is in recognition of Haas' academic record to date, 2022
- Recipient of LpS Digital Lecture Award – Best Scientific Lecture, 2021
- Recipient of the Enigunity Connected Places Innovation Award, 2021
- 14 best paper awards including IEEE Jack Neubauer Memorial Best Paper Award 2015 and EURASIP Best Paper Award for the Journal on Wireless Communications and Networking in 2015, also including four best paper awards at *IEEE ICC* 2016, 2017, 2018 and 2022, *IEEE Globecom* 2022 (*IEEE ICC* and *Globecom* are the two IEEE flagship conferences in communications), *IEEE VTC-Spring* 2015, *IEEE VTC-Fall* 2013, *IEEE IWCMC* 2016, *ICCT* 2011, *IEEE PIMRC* 1999, as well as *Photonics Technology Letters (PTL)* 2022
- Received 2019 James Evans Avant Garde Award of the IEEE Vehicular Technology Society for *pioneering contributions to multiple antenna transmission systems and optical wireless communications, in particular spatial modulation and LiFi (Light Fidelity)*
- Recipient of the 'Outstanding Achievement Award' of the International Solid-State Lighting Alliance (ISA) which was presented by Nobel Laureate, Professor Shuji Nakamura, November 2016
- Recipient of the Tam Dalyell Prize 2013 awarded by the University of Edinburgh for excellence in engaging the public with science.
- Selected as one of the 10 EPSRC RISE leaders in the UK (Recognising Inspirational Scientists and Engineers) 2014
- Siemens Semiconductor (now Infineon AG), Munich, Germany; May 1998; Co-Winner of Business Plan Competition for Microelectronics 1997/1998 (AddVenture) with the proposal: Software Licenses & Services (Software Lizenzen & Dienstleistungen) awarded with DEM 50,000

RECOGNITION / ESTEEM

- Shortlisted for the European Inventor Award 2023' in the category 'Research'
- More than 180 invited talks and keynotes, including keynotes at international IEEE conferences such as IEEE Vehicular Technology Conference (VTC)-Spring 2023, IEEE Globecom 2023, IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), 2020, Signal Processing Advances in Wireless Communications (SPAWC), 2017
- Invited Chair of NATO Task Group ET-115, Optical Wireless Communications, 2020 - 2022
- Invited Chair of NATO Research Task Group RTG-199, Optical Wireless Communications, 2022–to date
- Elected Fellow of the Royal Academy of Engineering (FREng), 2019
- Elected Fellow of the IET (FIET), September 2018
- Elevation to IEEE Fellow (FIEEE), November 2017
- Recipient of the Royal Society Wolfson Research Merit Award, July 2017

HIGH-LEVEL COMMITTEES

- Member of the EPSRC ICT Strategic Advisor Team (SAT), 2020 – to date
- Member of the Awards Committee of the Royal Academy of Engineering, 2020 - 2022
- Member of the Fellows Selection Committee (Panel 7) of the Royal Academy of Engineering, 2020 - 2022
- Chair of the Fellows Selection Committee (B3) of the Royal Society of Edinburgh, 2023 – to date
- Member of the International Committee of the Royal Society of Edinburgh, 2017 – 2020
- International Advisor of the International Solid State Lighting Alliance, 2018 – to date

PHD STUDENT GRADUATION

- Successfully Graduated 44 PhD students, with successful careers in academia and industry, e.g. Dr. Hany Elgala, Associate Professor, University of Albany, USA, Dr. Aburazak Mudesir, Group CTO of Deutsche Telekom, Germany