Prof. Holger Claussen
PhD, IEEE Fellow

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PROFILE

Research Leader, Scientist and Innovator with 24 years' experience in imagining and inventing the future of wireless communication networks. Proven ability to build 'world-leading' research teams and leading large international research projects in Wireless Communications, Network Protocols, Energy Efficiency, and Artificial Intelligence. Author of the book, 'Small Cell Networks', 149 Journal and conference publications, 127 patent families and applications, with 10726 citations and h-index 47. World Technology Award in Communication Technology for innovative work of the greatest lightly long-term significance in the area of Small Cells. Member of the Royal Irish Academy and IEEE Fellow.

PROFESSIONAL EXPERIENCE

Professor of Wireless Communications, Trinity College Dublin 2022 – Present

Professor of Wireless Communications, University College Cork 2022 – Present

Head of Wireless Communications Laboratory, Tyndall National Institute 2020 – Present

Dublin, Ireland

- Creating Tyndall's new Wireless Communciations Research Laboratory with teams in RF, Access, Protocols, AI and Quantum Systems to invent the future of wireless communication networks.
- Won >€12M project and infrastructure funding, allowing my lab to grow to 20 researchers in 2025.
- Principal investigator of the GUARD project, creating smart drone technology to help the Irish Navy to address the large societal problem of drug smuggling to Ireland and the EU (see https://theguardproject.com/).
- Principal investigator of the MISTRAL project, enabling reliable long range VHF communications coverage for the Irish Defence Forces through drone-based relaying (see https://www.youtube.com/watch?v=CW5VnEforRk).
- Principal investigator of Enterprise Ireland Commercialization Fund project HyperPath for creating a start-up company commercializing novel multi-connectiviy protocols for ultra-relable low latency communication over unreliable wireless networks with drone and Industry 4.0 applications. The startup was founded in December 2024. (see https://www.hyperpath.ie).

Department Head, Bell Labs, Nokia[1] 2009 – 2020

Wireless Communications Research Department, Dublin, Ireland & Murray Hill, USA from 2019.
Small Cells Research Department, Dublin, Ireland & Murray Hill, USA from 2013.
Autonomous Networks & Systems Research Department, Dublin, Ireland from 2009.

- Built research team of 15 scientists and 7 PhD students in the area of wireless communications, evaluated as "world-leading" by an international review panel of the Irish Government in 2014.
- Pioneered Small Cells and enabled $11.3bn/a market. Invented self-optimization of cellular base stations and scalable architecture that enabled commercial deployment. Our work resulted in creation of the Small Cells business unit which became market leader with 142 deployments with 82 network operators in 42 countries.
- Created the foundation for many of Nokia's next generation products including: LightRadio, FutureCell, reliable low latency train and maritime communications solutions, indoor localization product portfolio including 5G, and privacy preserving Covid-19 contact tracing using mobile networks.
- Started Bell Labs' localization research and cloud computing research which grew into new research departments in 2019 and 2013, respectively.
- Led exploratory long term research on genetic evolution of self-optimization algorithms, fundamental advances in AI processing, robot communication, the world's first programmable RF hardware, novel wireless mm-wave network architectures using meta-materials, and optical wireless communications.
- Led Nokia's Wi-Fi research and standardization activities in IEEE 802.11be (Wi-Fi 7) with focus on multi-AP coordination and multi-link operation for enabling reliable low latency in unreliable unlicensed frequency bands.
- Technical Lead of Nokia's 6G USA research consortium initiative, leadership of Bell Labs' flagship research program on Hyper Critical Wireless communications, and leadership of business interactions with Nokia's Fixed Networks business group for technology transfers from Bell Labs globally.
- PhD Examiner of Dr. David López-Pérez, University of Bedfordshire, UK, 2011; Dr. Gilbert Micallef, Aalborg University, Denmark, 2013; Dr. Carlo Galiotto, Trininty College Dublin, Ireland, 2017.

[1]Formerly Bell Labs was part of Alcatel-Lucent prior to acquisition by Nokia in 2015.

- Attracted >€11M external funding from IDA Ireland for the creation of Bell Labs Ireland, for EU Marie Curie projects PAINLESS, MINTS, GREENEDGE, and several PhD and PostDoc fellowships form the Science foundation Ireland.
- Team invented >270 patents with an approximate value to Nokia of €101M, authored >320 publications in the leading journals and conferences with >15.000 citations, and the Wiley/IEEE press book "Small Cell Networks".
- External team awards including individual: World Technology Award in Communications Technology 2014, Humies Gold Award 2019, Edison Award Silver 2017, CTIA E-Tech Award, Eckerman TJA prize 2009, IEEE Comsoc Best YPs Award 2016, Best Paper Awards at IEEE PIMRC'19, IEEE WCNC'18, Inishcom'18, IEEE PIMRC'03, EPMCC'03, Most attended industry program at IEEE Globecom'17, Irish Lab Awards: Laboratory scientist of the year 2018, Laboratory team of the year 2016, Commercial Laboratory of the year 2014, and overall prize Laboratory of the year 2014.

Research Engineer, Bell Labs, Alcatel-Lucent[2] **2004 – 2009**

Wireless Communications Research Group, Swindon, UK.

- Invented self-configuration and self-optimization algorithms and a system architecture that enable interoperability of femto- and macrocell networks, and allows simple plug and play deployment of cellular base stations. These innovations are key enablers for large scale femtocell deployments.
- Technical Lead for the successful technology transfer of self-configuration and self-optimization algorithms and relating architecture into the UMTS and CDMA business units. The transferred solutions have been commercialized in Alcatel-Lucent's Small Cells product portfolio and are a main product differentiator.
- Contributed to various external research projects, including the EU funded IST projects ADAMANT, Ambient Networks 2.
- Co-organizer of workshop on Autonomic Communications at IEEE CCNC 2006 and Member of the Technical Program Committee and Session Chair at IEEE PIMRC 2005, 2006, and 2007.
- Consulting on future wireless evolution and self-optimizing networks to various organizations including Vodafone, O_2, Telefonica, Telecom Italia, T-Mobile, Bouygues Telecom, Bank of America, Comcast/ SpectrumCo, Cambridge Wireless, OfCom (UK regulator), ComReg (Irish regulator), Thales UK, Danish Military, and at Cranefied University, Defence Academy of the United Kingdom.

EDUCATION

Ph.D, University of Edinburgh **2001 – 2004**

Signals & Systems Research Group, Edinburgh, UK. Studentship funded by Bell Labs, Lucent Technologies, Swindon, UK.

- Thesis title: "Low Complexity Receiver Architectures for High-Speed Wireless Multiple Input Multiple-Output (MIMO) Systems" in the area of signal processing for digital communications [267].
- Area of study: Mathematical modelling, information theoretic analysis and optimisation of wireless communication systems, low complexity receiver architectures, space-time equalisation, turbo-coding, interference cancellation, and neural network based optimisation techniques.

Dipl.Ing.(FH) and M.Eng., University of Applied Sciences Kempten & University of Ulster **1995 – 2000**

Integrated European Study in Electronic Systems, Kempten, Germany, and Jordanstown, UK.

- Thesis title: "Very High Speed Digital Radio Modem using Analogue Video Transmission" in the area of microprocessor systems and digital signal processing [280].

EXTERNAL AWARDS

- Elected to Member of the Royal Irish Academy (RIA), 2025.
- Elevation to *IEEE Fellow*, citation "for contributions to small cell wireless network technology", class 2022.
- *Humies Gold Award 2019* for best human competitive AI published in the open literature during the previous year for the paper "Automated Self-Optimization in Heterogeneous Wireless Communication Networks" [30].
- *2014 World Technology Award* in the individual category Communications Technologies for innovative work of "the greatest likely long-term significance" for pioneering Small Cell Networks.
  Past individual winners include Elon Musk, the co-founder of PayPal and Tesla Motors, Mark Zuckerberg, the co-founder of Facebook, Larry Page and Sergey Brin, the co-founders of Google, Chad Hurley and Steve Chen, the co-founders of YouTube, Gordon Moore, the co- founder of Intel, Craig Venter, one of the first to sequence the human genome.
- *2008 Eckermann-TJA Prize* for the paper "Leveraging advances in mobile broadband technology to improve environmental sustainability," Telecommunications Journal of Australia Volume 59, No. 1, February 2009 [204].

[2] Formerly Bell Labs was part of Lucent Technologies prior to merger with Alcatel in 2006.

- *Excellent Paper Award* for the paper "Improved Max-Log-MAP turbo decoding using maximum mutual information combining" at the 14th IEEE International Symposium on Personal, Indoor and Mobile Radio Communications PIMRC 2003, Beijing, China [272].
- *Best Paper Award* for the paper "Layered encoding for 16- and 64-QAM iterative MIMO receivers" at the 5th European Personal Mobile Communications Conference EPMCC 2003, Glasgow, UK [273].
- Finalist and representative of the University of Ulster, UK, at the Siemens Young Engineer of the Year Award 2000.
- First prize for the best M.Eng. project at the IEE Prize Competition, University of Ulster, UK.

APPENDIX: PUBLICATIONS & PATENTS

Citation indices

- Citations 10726 (source: Google Scholar, Apr. 2025)
- h-index 47
- i10-index 118

Publications

- 1 book [46]
- 3 book chapters [126], [130], [133].
- 53 journal or magazine publications [4], [9], [10], [12], [13], [14], [15], [16], [17], [18], [19], [20], [25], [27], [28], [29], [30], [31], [32], [36], [37], [43], [48], [51], [57], [58], [59], [62], [70], [72], [77], [92], [93], [96], [97], [99], [109], [117], [123], [134], [154], [161], [183], [184], [186], [187], [197], [201], [204], [205], [212], [224], [261], [262].
- 92 conference publications [1], [3], [5], [6], [8], [21], [22], [23], [24], [26], [35], [38], [39], [40], [41], [42], [47], [49], [50], [54], [55], [56], [60], [61], [66], [71], [73], [74], [75], [76], [78], [80], [81], [82], [83], [87], [88], [95], [98], [106], [107], [108], [110], [119], [124], [125], [131], [132], [135], [138], [139], [145], [151], [152], [153], [155], [158], [160], [164], [165], [170], [171], [176], [178], [180], [181], [182], [192], [198], [203], [206], [208], [213], [223], [225], [234], [235], [238], [242], [243], [244], [256], [260], [263], [265], [268], [271], [272], [273], [275], [276], [277].
- 1 Ph.D. thesis [267]
- 1 M.Eng. thesis [280]

Patents

- 89 granted patent families [33], [34], [52], [53], [63], [64], [67], [68], [69], [79], [86], [90], [91], [94], [100], [102], [105], [111], [112], [113], [114], [115], [116], [121], [122], [127], [136], [137], [140], [141], [142], [143], [147], [149], [156], [157], [162], [163], [166], [167], [168], [169], [173], [174], [175], [177], [179], [185], [188], [189], [191], [195], [196], [199], [200], [209], [210], [211], [215], [216], [218], [219], [220], [221], [222], [226], [227], [228], [229], [230], [231], [232], [239], [240], [241], [245], [246], [247], [248], [250], [251], [252], [254], [255], [257], [258], [274], [278], [279].
- 38 filed patent applications [2], [7], [11], [44], [45], [65], [84], [85], [89], [103], [104], [118], [120], [128], [129], [144], [146], [148], [150], [159], [172], [190], [193], [194], [202], [207], [214], [217], [233], [236], [237], [249], [253], [259], [264], [266], [269], [270].

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[2] K. Fahmi and H. Claussen, "Software-defined multi-path virtual network," Patent application 2417196.9, Nov. 2024.

[3] B. Galkin, L. Ho, P. Brophy, and H. Claussen, "Experimental evaluation of a low-cost UAV-based system for locating ground transmitters," in *2024 IEEE 100th Vehicular Technology Conference (VTC2024-Fall)*, 2024, pp. 1–7.

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[6] J. Viana, B. Galkin, L. Ho, and H. Claussen, "Enhancing UAV path planning efficiency through accelerated learning," in *2024 IEEE 29th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD)*, 2024, pp. 1–6.

[7] S. Bulja, L. Ho, and H. Claussen, "Improvements in and relating to electromagnetic wave transmission," Patent application 2320033.0, Dec. 2023.

[8] B. Galkin, L. Ho, K. Lyons, G. Celik, and H. Claussen, “Experimental evaluation of air-to-ground vhf band communication for uav relays,” in *2023 IEEE International Conference on Communications Workshops (ICC Workshops)*, 2023, pp. 1428–1432.

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