



CURRICULUM VITAE

Professor Julian Gardner FIET FIEEE FREng FRS

Website: www.warwick.ac.uk/MBL

Julian William Gardner *BSc PhD DSc CEng FIET FIEEE FREng FRS* is Professor of Electronic Engineering at the University of Warwick, UK. He has an H-index of over 75 having published more than 600 technical papers, as well as authored 8 books, and an inventor on over 22 patents. He was elected a Fellow of the Royal Society of London in 2023 and a Fellow of the IEEE in 2019. He is also a Fellow of the IET and the Royal Academy of Engineering. He has won numerous awards including the Royal Society Mullard Innovation Award in 2018, the Technical Award by the IEEE Instrumentation & Measurement Society in 2017 for contributions to chemical sensing, and the IET JJ Thompson Medal for Achievements in a Electronics in 2007. In addition to being Professor of Electronic Engineering, he is Founder and Director of the Microsensors & Bioelectronics Laboratory (MBL) in the School of Engineering at Warwick University. His research has led to the spin-out of six companies, most notably he co-founded and was a director of Cambridge CMOS Sensors Ltd in 2008. CCS Ltd was voted Company of the Year in both 2012 and 2015 at the Business Weekly Awards and bought by ams AG in June 2016. He then co-founded the companies Flusso Ltd and Sorex Sensors Ltd in 2016 with Flusso being sold in 2023. He is currently technical advisor to several companies including Flusso Ltd and Sorex Sensors Ltd. His research interests are in the field of silicon-based sensors & MEMS devices, with specialism in chemically-sensitive materials, environmental sensing, artificial olfaction & electronic noses, CMOS sensors, and multi-sensor signal processing techniques including machine learning and artificial intelligence.

Current Employment/Job Titles:

- Professor of Electronic Engineering, University of Warwick
- Head of Microsensors & Bioelectronics Laboratory (MBL), Warwick University
- European Regional Chair of International Society for Olfaction and Chemical Sensors
- Co-founder & Technical Advisor for Flusso Ltd
- Co-founder & Technical Advisor for Sorex Sensors Ltd

Current & Past Roles:

2021-24	Technical Advisor for OW Digital Smell (now Hynt Ltd).
2011-23	Head of Electrical & Electronic Engineering Discipline, Warwick University.
2013-16	Chief Scientist of Cambridge CMOS Sensors Ltd.
2012-16	Treasurer & director of International Society for Olfaction and Chemical Sensing.
2010-12	President of International Society for Olfaction and Chemical Sensing.
2008-10	Vice President of International Society for Olfaction and Chemical Sensing.
2008-12	CTO and Founding director of Cambridge CMOS Sensors Ltd.
2006-14	Director of Centre for Cognitive & Neural Systems.
2005-08	Dean of School of Engineering, University of Warwick

Education:

- 1997 DSc, University of Warwick, Coventry, UK.
1979-83 PhD, Queens' College, University of Cambridge, Cambridge, UK.
1976-9 BSc (Physics, 1st Class) at University of Birmingham, Birmingham, UK.

Recent Awards (12 in career):

- 2018 Won Royal Society Mullard Innovation Award with Florin Udrea
2017 Won IEEE Technical Award (Instrumentation & Measurement section).
2015 NMI Innovation Award, London.
2014 Best of Sensors Expo Award, USA.
2013 Received CleanTech Company of the Year Award (Business Weekly) from Lord Sainsbury, Cambridge.
2011 Highly Recommended Start-up Company of the Year, British Engineering in Excellence Awards, London.
2007 Awarded JJ Thomson Medal for Achievement in Electronics by Institution of Engineering and Technology, UK.

Learned Society Membership:

- Elected Fellow of Royal Society of London, UK (2023)
- Elected Fellow of Institute of Electrical & Electronic Engineers, USA (2019)
- Fellow of the Royal Academy of Engineering, UK (2006)
- Fellow of Institute of Physics, UK (2004-8)
- Elected Fellow of the Institution of Engineering and Technology, UK (1997)
- Fellow of Alexander van Humboldt Society, Germany (since 1994)

Current Research Staff and Postgraduate Students comprise 4 Postdoctoral research assistants, 2 PhD students (> 35 successfully graduated), 2 MSc/MPhil student (> 30 successfully graduated)

Services to Profession:*Some External National Committees and Editorships*

- Member of Royal Academy of Engineering Steering Committee for Research Fellowships (2023-)
- Academic mentor for Royal Academy of Engineering (Industrial Chair and RFs).
- Committee Member of Royal Society International Newton Fellowship (2023-)
- Member of Royal Society Selection Committee, SC (2023-)
- Member of ERC Proof of Concept Panel (2022-)
- Associate Editor of IEEE Sensors Letters Journal (2018-23)
- Member of Royal Academy Industrial Fellowships Panel (2017- 20).
- Chair of ERC Panel PE8 for Synthesis Grants (2018-2020).
- Deputy Chair of ERC Panel PE8 Consolidator grants (2015-17).
- President of International Society for Olfaction and Chemical Sensors (2009-11).

Recent Activities associated with International Conferences

- Member of International Steering Committee of International Meeting of Chemical Sensors (2000-).
- Honorary Fellow and member of technical committee of Eurosensors.
- Member of Eurosensors technical committee (2000-2020).
- Chair of the Steering Committee of The International Symposium on Olfaction & Electronic Noses (ISOEN 2013).
- Executive member of Eurosensors Steering Committee (2000-2011).
- Co-director of ISOCS Winter Schools in 2009, 2011, 2014, 2016.

Some Recent Publications

1. Zhou B, Cheng Q, Chen Z, Chen Z, Liang D, Munro E, Yun G, Kawai Y, Chen J, Bhowmick T, Kannan P, Occhipinti L, Matsumoto H, **Gardner JW**, Hasan T 2024 *Nature Communications* **15** 3652 “Universal Murray’s law for optimised fluid transport in synthetic structures”
2. Chen Z, Zhou B, Xiao M, Bhowmick T, Padmanathan K, Yang L, Occhipinti L, **Gardner JW**, Hasan T 2024 *Science Advances* **10** “Real-time, noise and drift resilient formaldehyde sensing at room temperature with aerogel filaments”
3. Esfahani S, Dawson T, Urasinska-Wojcik, Cole M, **Gardner JW** 2024 *Proceedings* **97**. “Indoor air quality CO₂ thermally modulated SMR sensor”
4. Wardana INK, Fahmy SA, Gardner JW 2024 IEEE I2MTC “Low-cost SCADA/HMI with tiny machine learning for monitoring indoor CO₂ concentration”
5. Wardana I, **Gardner JW** and Fahmy S 2024 **73** 2503612 *IEEE Trans Inst Meas* “Collaborative learning at the edge for air pollution prediction”
6. Wardana I, Fahmy S, **Gardner JW** 2023 *IEEE Sensor Letters* **7** No 11 “TinyML models for a low-cost air quality monitoring device”
7. Gardner E, **Gardner JW**, Udrea F 2023 *Sensors* **23** 681 “Micro-machined thermal gas sensors – a review”.
8. Wardana I, **Gardner JW** and Fahmy SA 2022 *Neural Computing & Applications* **34** pp.16129-16154 “Estimation of missing air pollution data using a spatiotemporal convolutional autoencoder”
9. Specht JP, Esfahani S, **Gardner JW** 2022 *IEEE Trans on Instrumentation and Measurement* **71** “Thermally modulated CMOS-compatible particle sensor for air quality monitoring”
10. Wardana I, **Gardner JW**, Fahmy S 2021 *Sensors* **21** 1064 “Optimising deep learning at the edge for accurate hourly air quality prediction”
11. Popa D, Hopper R, **Gardner JW** and Udrea F 2021 *Nature Scientific Reports* **11** “A highly stable, nanotube-enhanced CMOS-MEMS thermal emitter for mid-IR gas sensing”
12. Specht JP, Esfahani S, **Gardner JW** 2021 *IEEE Sensors Journal* **21** “AIN FBAR particle sensor with a thermophoretic sampling mechanism”
13. Wardana I, **Gardner JW**, Fahmy S 2021 *Sensors* **21** 1064 “Optimising deep learning at the edge for accurate hourly air quality prediction”
14. Esfahani S, Rollins P, Specht J, Cole M, **Gardner JW** 2020 *IEEE Sensors* “Smart city battery operated indoor air quality monitoring system”
15. Esfahani S, Shanta M, Specht J, Xing Y, Cole M and **Gardner JW** 2020 *IEEE Sensors* “Wearable IoT electronic nose for urinary incontinence detection”
16. Esfahani S, Specht J, Jolly G, Cole M, **Gardner JW** 2020 *MDPI Proceedings* **56** 11 “Solidly mounted resonators for biomedical applications”
17. Book chapter: Guha P, Santra S and **Gardner JW** (2020) in *Semiconductor Gas Sensors* 2nd edition (Eds. R. Jaaniso et al.), Ch 15 pp465-487, Woodhead Publishing. “Integrated CMOS-based sensors for gas and odour detection” ISBN: 9780081025598
18. Book chapter: **Gardner JW** and Guha P (2020) in *Advanced Nanomaterials for Inexpensive Gas Microsensors*, Llobet (Ed) Ch7, pp125-141. Advanced Nanomaterials Series, Elsevier “CMOS based resistive and FET devices for smart gas sensors”

Full publication list with over 600 publications, including 12 books is available from the MBL website.

Recent Grants and Contracts – Total Value over past 10 years of ca. £10 million

- EPSRC, Horizon Europe, Innovate UK, Industry.

Industrial Engagement

Inventor on over 22 patents and co-founder of six spin-out companies. Current spin-out companies are Sorex Sensors Ltd and Flusso Ltd both based in Cambridge. He has been a technical advisor to many large companies (e.g. Hewlett-Packard, Honeywell, LG, and Sony).