

Abdelwahed (Abdo) Khamis

<https://abdelwahed.github.io>

Research Scientist (**CSIRO**)
—**Data61, Distributed Sensing Systems**
Adjunct Lecturer (**QUT**)
—**School of Information Systems**

abdelwahed.khamis@data61.csiro.au

abdo.khamis@qut.edu.au

Mobile : +61 (449) 676796

Interests: Multi-modal Sensing, RF and mmWave Sensing, AI, Machine Learning on the Edge.

EDUCATION

- **University of New South Wales** Sydney, Australia
PhD in Computer Science *March. 2016 – June 2020*
 - **Thesis:** “Wireless Sensing for Medical Applications”
 - **Advisors:** Wen Hu, Chun Tung Chou (UNSW) and Brano Kusy (Data61, CSIRO)
 - **Research Question:** Can we monitor human health using WiFi/wireless signals?
 - **Outcomes:** Systems for breathing, heartbeat and handwashing monitoring relying solely on wireless signals.
- **Zagazig University** Zagazig, Egypt
Master of Computer Science *March. 2010 – 2013*
 - **Thesis:** “Mobile Computing System for Assisting the Deaf”
 - **Advisor:** Moustafa Youssef (Alexandria Uni) and Ibrahim Elhenawy (Zagazig Uni)
- **Zagazig University** Zagazig, Egypt
Bachelor of Computer Science, *March. 2003 – 2007*
 - **GPA:** 85.5%, ranked **third** (CS department)
 - **Honours Project:** “Mobile Administration of Remote System”,
 - Top project award (**third place**) in the ESEA Employment Fair 2007
 - Egypt’s ITAC Graduation Projects Grant **one of 25 projects** selected across the nation

RESEARCH EXPERIENCE

- **CSIRO, Data61** Brisbane, Australia
Research Scientist and Project Leader *November 2022 - Present*
 - **(Technical Lead) Embodied Foundational Models:**
Research Goal: Develop reusable AI models that can understand, reason over, and act on multimodal robotic data, including vision, LiDAR, IMU, language, and action signals.
 - **(Project Leader) AI Intelligent Multimodal Sensor Platform:**
Research Goal: Designing multimodal deep learning sensing system that can do with minimum labels.
 - **(Project Leader) SensorGPT :**
Research Goal: Zero-effort generation of various sensory modalities using ML and a physically principled pipeline.
- **CSIRO, NCMi** Canberra, Australia
CERC Postdoctoral Fellow *May 2021 - November 2022*
 - **Deep Traits Extraction from Natural Collections:**
Supervisor: Lars Petersson and Vivien Rolland
Research goal: Vision-based deep Object Detection for extracting fine-grained traits from Herbarium (preserved plants) Sheets and insects Collection
- **UNSW** Sydney, Australia
Research Associate *March 2020 - 2021*

- **Bluetooth Low Energy (BLE) Authentication for Cars Key-less Entry Systems:**

Supervisor: Sanjay Jha

Research goal: Investigating ways for secure authentication in the new generation of key-less car systems.

Duties: designing and implementing BLE-based security and authentication schemes (using BlueZ stack) and drafting research papers.

Project Manager

- **Low-latency and Resilient Wireless Sensor Network:**

Supervisors: Wen Hu and Sanjay Jha

Research goal: Designing and implementing efficient wireless sensors network system for monitoring train carriages interiors.

Duties : technical supervision of team members (a PhD and two undergrads), planning deliverables, preparing milestones reports, arranging internal/external meetings and communication with the industry partner.

CSIRO Data61

Sydney, Australia

Visiting Scientist

Nov 2019 - Present

- **Vertigo; deep object detection and segmentation for underwater mapping (Nov. 2019 - Mar. 2020):**

Supervisors: Brano Kusy (Data61)

Research Goal: Automatic analysis of videos captured using underwater vehicle (Vertigo) that surveys the sea bed in Australia using machine learning.

Duties: developing deep learning pipeline for underwater species detection and classification and mentoring graduate student working on the project.

CISCO & UNSW

Sydney, Australia

Graduate Investigator

March 2019 - Present

- **CISCO Device-free Behavioural Analytics Using In-situ WiFi Signals Project:**

Supervisors: Mahbub Hassan and Wen Hu (UNSW)

Research Goal: Developing WiFi contact-less sensing systems that can work in *uncontrolled environments* with main focus on human behaviour tracking.

Duties: mentoring PhD student, planning and conducting data collection and drafting research papers

CONFERENCE LEADERSHIP & SERVICE

- **ISWC/UbiComp 2026 Technical Program Committee. Notes and Briefs Track.** [CORE:A*]
- **EWSN 2026 Technical Program Committee** [CORE:B]
- **PerCom 2025 WIP Track Technical Program Committee** [CORE:A*]
- **WebConf 2025 (formerly WWW) Technical Program Committee** [CORE:A*]
- **ISWC/UbiComp 2025 Technical Program Committee** [CORE:A*]
- **UbiComp 2024 mmWave Sensing Session Chair** [CORE:A*]
- **ISWC/UbiComp 2024 TPC** [CORE:A*]
- **IPSN 2024 TPC** [CORE:A*]
- **IoTDI 2024 TPC**
- **IoTDI 2024 FMSys Workshop TPC**

(workshop) International Workshop on Foundation Models for Cyber-Physical Systems & Internet of Things (FMSys)

- **UbiComp 2021 Workshop TPC** [CORE:A*]

(workshop) Combining Physical and Data-Driven Knowledge in Ubiquitous Computing

CONFERENCE AND WORKSHOP ORGANISATION

- **🎓 PerCom 2026 First International Workshop on Pervasive Radars** [CORE:A*]
In collaboration with Anuradha Ravi (UMBC, USA), Sandip Chakraborty (IIT, India) and Suchetana Chakraborty (IIT, India)

SERVICES

- **External PhD Examiner:** University of Queensland 2024
- **Publicity Chair :** IPSN '23 (Core:A*)
- **Reviewer (venue, year):** ICML 26, WWW 26, PerCom WIP 26, BMVC 25, ICCV 25, CVPR 25, IMWUT 22,23,24,25 , TMC 24, TPAMI 24, PMC 24, 25, CCS 22, SenSys 23, IPSN 23, IoTDI 23, ICIP 24
- **Zoom Master :** IPSN '20 (Core:A*)

AWARDS

- 🏆 **CVPR 2025 Outstanding Reviewer** [CORE:A*]
Selected among 5.6% top reviewers (from a total of 12,593 reviewers)
- 🏆 **IPSN 2020 Best Poster Award** [CORE:A*]
A. Khamis, C. Chou, B. Kusy and W. Hu "Poster: A Weakly Supervised Tracking of Hand Hygiene Technique"

COMPETITIVE FUNDING

- **Industry PhD Program Grant** 2025
\$200K (1 Ph.D position) Multi-Agent Intelligent Edge Computing for Adaptive Demand Response Management
- **CSIRO Science Digital Scheme** 2023
\$300K (2 Ph.D positions) ExperimentGPT: An AI Assistant that Can Read the Scientist's Mind
- **CSIRO Vacation Student Funding** 2023
\$10K (1 vacation student position) SensorGPT Project

MEDIA COVERAGE

- 📺 **ABC News June 22 on my Object Detection Research**
"Digitising the Australian National Herbarium may help us better understand how plants respond to climate change"
Video: → <https://youtu.be/ecn8YZNR9Gc>

GUEST LECTURES

Queensland University of Technology Brisbane, Australia
Guest Lecturer (hosted by Dr. Sara Khalifa)

- **2024 - Applied Internet of Things (IAB330):**
Artificial Intelligent Internet of Things (AIoT)

University of Queensland Brisbane, Australia
Guest Lecturer (hosted by Dr. Matthew D'Souza)

- **2025 - Advanced Embedded Systems (CSSE4011):**
Efficient Deep Learning
- **2023 - Advanced Embedded Systems (CSSE4011):**
Introduction to Deep Learning
Material: → <https://youtu.be/zOAD4j1X4kw>
- **2023 - Advanced Embedded Systems (CSSE4011):**
Federated Learning Tutorial
Material: → https://github.com/abdelwahed/FL_tutorial
- **2022 - Advanced Embedded Systems (CSSE4011):**
The Future of Sensing with mmWave Technology
Material: → <https://youtu.be/f9jrcE6FoLE>

University of Canberra Canberra, Australia
Guest Lecturer (hosted by Dr. Ibrahim Radwan)

- **2021 - Data Science Course:**
Geospatial Data Analysis: Sydney's Eating-out Case Study

CONSULTING

SOFTWARE ENGINEERING EXPERIENCE

- **DataLinkSystems Inc** Canada [*working remotely*]
Mobile Software Engineer *Jan. 2014– Oct. 2020*
 - **AVL GPS Tracking Services over Cellular Networks** : Designed and implemented proprietary wireless protocols for asset/vehicle tracking software. Developed tablet and mobile software clients for “DataGate” that used various communication modalities from GSM, KENWOOD radios to Iridium satellites.
- **WBS** Sydney, Australia
Software Engineer *Apr. 2017- Oct. 2017*
 - **IoT Emergency Lights System “EMIoT”** : Created AWS-based backend for Internet of Things Emergency Light System and developed a gateway for the LoRa-based nodes installed in smart lighting package..
- **Khabeer Group** Cairo, Egypt
Senior Software Developer *Jan. 2010- Jan. 2014*
 - **Healthcare Information System “PrimeCare”** : Lead the design and development of Android mobile and tablet applications (HisproTablet), and contributed many modules to the flagship web system PrimeCare (serving **24 million** patients)
- **TayaIT** Cairo, Egypt
R&D Engineer *Jan. 2011- Jan 2012*
 - **Natural Language Processing**: developed **ArNER** Arabic Named Entity Detector using corpus based-on Arabic version of Wikipedia and **LingArNER** enhanced, Hidden Markov Model -based version of ArNER using LingPipe toolkit.

SCHOLARSHIPS

- **CISCO Device Free Sensing Scholarship** March 2019 - Dec. 2019
\$20K awarded by CISCO Research Center
- **WBS IoT Innovation Connection (Stage 2) Scholarship** Apr. 2017 - Oct. 2017
\$11K awarded by WBS company & UNSW
- **Data61 PhD top-up Scholarship** March 2016 - Sept. 2019
\$30K awarded by CSIRO, Data61
- **UNSW PhD Scholarship** March 2016 - Sept. 2019
\$280K Tuition fee scholarship \$95K Living allowance

RESEARCH COLLABORATION

- **Energy Queensland** Australia, Brisbane
Kieren Astin-Walmsley *[2025 - present]*
 - **Projects**: “Multi-Agent Intelligent Edge Computing for Adaptive Demand Response Management”
- LA TROBE University** Australia, Melbourne
Dr. Ali Zia *[2024 - present]*
 - **Projects**: various projects on “Topological Deep Learning”, “Generative Modelling” and “Salient Detection”
- QUT** Australia, Brisbane
Dr. Raja Jurdak, Dr. Sara Khalifa *[2024 - present]*
 - **Projects**: “Self-Supervised Human Behavior Understanding from Energy Harvesting Wearables”
- QUT** Australia, Brisbane
Dr. Sara Khalifa *[2022 - 2024]*
 - **Projects**: “ExperimentGPT: An AI Assistant that Can Read the Scientist’s Mind”, “ SensorGPT project”

CISCO Research Center

Dr. Avinash Kalyanaraman/ Dr. Xiaoqing Zhu

Texas, USA

[Mar. 2019 - 2021]

- **Project:** “Device Free Behavioural Analytics Using in-situ WiFi Sensing ”

University of Canberra

Dr. Ibrahim Radwan(A. Prof.)

Australia

[Oct. 2020 - Present]

- **Project:** “Contrastive Deep Fusion of Sensory Views for Human Activity Recognition”

UNSW (School of Medicine)

Dr. Mary-louise McLaws (Professor & World Health Organization (WHO) Advisor)

Australia

[Oct. 2018 - 2020]

- **Interdisciplinary Project:** “Device-Free RF-based Hand Hygiene Technique Monitoring”

Mitsubishi Heavy Industries

Kazuumi Kondo (Engineering Manager)

Japan

[August. 2020 - 2021]

- **Project:** “Low-latency and Resilient Wireless Sensor Network”

SELECTED PUBLICATIONS

- Yasien Ghalwash, **Abdelwahed Khamis**, Moid Sandhu, Sara Khalifa ,and Raja Jurdak. “SolarTrack: Exploring the Continuous Tracking Capabilities of Wearable Solar Harvesters” *International Conference on Pervasive Computing and Communications (PerCom) 2026*. [A*, AR:15%]
- **Abdelwahed Khamis**, Muhammad Umer Ramzan, Usman Ali, Ali Zia “HyperEcho: Structured Higher Order Representation for Automotive Radar Semantic Segmentation” *International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops) 2026*. [A*]
- Isura Nirmal, Wen Hu, Mahbub Hassan, Elias Aboutanios, and **Abdelwahed Khamis**. “Improving mmWave based Hand Hygiene Monitoring through Beam Steering and Combining Techniques.” *International Conference on Embedded Artificial Intelligence and Sensing Systems (SenSys) 2025* [A*, AR:18%]
- **Abdelwahed Khamis** and Sara Khalifa. “NeuralPrefix: A Zero-shot Sensory Data Imputation Plugin” *International Conference on Pervasive Computing and Communications (PerCom) 2025*. [A*, AR:15%]
- Renuka Sharma, **Abdelwahed Khamis**, Sara Khalifa, Dan Bretherton, and Brano Kusy. “Synthetic Sensory Data Generators: How Much Progress Are We Making?” *International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops) 2025*. [A*]
- Renuka Sharma, **Abdelwahed Khamis**, Sara Khalifa, Dan Bretherton, and Brano Kusy. “SensorGPT: A New Paradigm for Synthetic Sensory Data Generation” *International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops) 2025*. [A*]
- Mohammed Fawzy, **Abdelwahed Khamis**, Ibrahim Radwan, Mohammed Bennamoun, Farid Boussaid. “CrossFormer: Cross Spatio-Temporal Transformer for 3D Human Pose Estimation” *Signal, Image and Video Processing, 19(8), 618*.
- Jia Syuen Lim, Ziwei Wang, Jiajun Liu, **Abdelwahed Khamis**, Reza Arablouei, Robert Barlow, Ryan McAllister “ Real-time Multi-modal Object Detection and Tracking on Edge for Regulatory Compliance Monitoring” *International Joint Conference on Artificial Intelligence (IJCAI) 2024* [A*]
- **Abdelwahed Khamis**, Russell Tsuchida, Mohamed Tarek, Vivien Rolland, Lars Petersson “ Earth Movers in The Big Data Era: A Review of Optimal Transport in Machine Learning” *IEEE Transaction of Pattern Analysis and Machine Intelligence (TPAMI) 2024* [Q1, IF:23.6]
- Isura Narmil, **Abdelwahed Khamis**, Mahbub Hassan, Avinash Kalyanaraman, Rui Li and Wen Hu . “WiFi2Radar: Orientation independent single receiver WiFi sensing via WiFi to radar translation” *IEEE IoT Journal 2024* [Q1, IF:11.1]

- Ali Zia, **Abdelwahed Khamis**, James Nichols, Zeeshan Hayder, Vivien Rolland, Lars Petersson “ Topological Deep Learning: A Review of an Emerging Paradigm” *Artificial Intelligence Review 2024* [Q1, IF:12]
- Shujie Zhang, Tianyue Zheng, Zhe Chen, Jingzhi Hu, **Abdelwahed Khamis**, Jiajun Liu, Jun Luo “ OCHID-Fi: Occlusion-Robust Hand Pose Estimation in 3D via RF-Vision” *Proceedings of the IEEE/CVF International Conference on Computer Vision 2023* [A*, AR:26%]
- Mathilde Papillon, ..., **Abdelwahed Khamis**,... et al. “ICML 2023 Topological Deep Learning Challenge: Design and Results.” *In Topological, Algebraic and Geometric Learning Workshops 2023, pp. 3-8. PMLR, 2023* [Software Submission]
- Isura Narmil, **Abdelwahed Khamis**, Mahbub Hassan and Wen Hu “ Deep Learning for Radio-based Human Sensing: Recent Advances and Future Directions” *IEEE Communications Surveys and Tutorials 2021* [Q1, IF:35.6]
- **Abdelwahed Khamis**, Branislav Kusy, Chun Tung Chou, MaryLouise Maclaws and Wen Hu. “ RFWash: A Weakly Supervised Tracking of Hand Hygiene Technique” *SenSys '20* [CORE:A*, AR:20%]
- Qi Lin, Weitao Xu, Jun Liu, **Abdelwahed Khamis**, Wen Hu, Mahbub Hassan, and Aruna Seneviratne. “H2B: Heartbeat-based Secret Key Generation using Piezo Vibration Sensors”. *IPSN '19* [CORE:A*, AR:23%]
- **Abdelwahed Khamis**, Chun Tung Chou, Branislav Kusy, and Wen Hu. “WiRelax: Contact-less Respiratory Biofeedback During Meditation Using WiFi” *Elsevier Ad Hoc Networks Journal, Volume 107, 2020* [Q1, IF:4.8]
- **Abdelwahed Khamis**, Chun Tung Chou, Branislav Kusy, and Wen Hu. “CardioFi: Enabling Heart Rate Monitoring on Unmodified COTS WiFi Devices” *MobiQuitous '18* [CORE:A]
- **Abdelwahed Khamis**, Ali Armin, Juanita Rodriguez, Lars Petersson. “Explainable Artificial Intelligence Reveals Mimicry Continuum in Color Space” *submitted to Nature Communications*