

# Yen Kai

Scientist | Researcher | Engineer

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## PROFILE SUMMARY

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Seasoned Research Scientist with over 28 years of experience in wireless communications, driving innovation across academia, industry, and government-funded initiatives. Recognized for delivering award-winning technologies, securing multimillion-dollar grants, and solving complex signal processing challenges through cutting-edge algorithm design. Adept at building and leading cross-functional teams to translate advanced research into practical, high-impact solutions.

- Expertise in baseband receiver design, signal processing algorithms, and BER optimization
- Proficient in C and Python for simulation and prototyping of advanced communication systems
- Strong track record of collaboration with international research institutions and industry partners
- Demonstrated leadership in securing major grants and leading strategic R&D efforts across satellite, maritime, and terrestrial systems
- Published over 30 peer-reviewed papers, 2 book chapters, and a book in wireless communications, with an H-index of 8 (Scopus).
- Currently undertaking a full-time Advanced Professional Certificate in Data Science and AI (2nd May– 1st Aug 2025) from NTU to complement technical expertise with modern AI/ML techniques

## SKILLS & COMPETENCIES

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### Hard Skills

- **Key technologies:** 5G/6G, Non-Terrestrial Networks (NTN), VHF Data Exchange System (VDES), signal processing
- **Key programming languages:** C, Python (TensorFlow, Keras, Numpy, SciPy), MATLAB (Simulink, LabVIEW)
- **Communications networks:** Satellite, cellular, maritime wireless systems
- **Scientific writing & publishing:** Peer-reviewed papers, technical reports, LaTeX expert
- **Grant writing & funding:** Securing and leading multi-million-dollar R&D projects

### Soft Skills

- Problem-solving and critical thinking
- Verbal and written communication
- Cross-functional collaboration and teamwork
- Adaptability and flexibility
- Time management and organization

## PROFESSIONAL EXPERIENCE

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**Institute for Infocomm Research (I<sup>2</sup>R), A\*STAR**

*October 1996 - March 2025*

**Principal Scientist II**

- Secured a SG\$2M Future Communications Programme (FCP) 1.0 research grant focused on 5G/6G-based Non-Terrestrial Networks (NTN) for emergency communications in Singapore

- Led the development of a VDES transceiver prototype, one of the world's first, earning two national innovation awards
- Managed a SG\$1M grant project to design advanced baseband receiver algorithms for satellite imagery processing
- Developed joint source-channel decoding algorithms in collaboration with a multinational corporation, yielding a 10x BER improvement and 3 dB PSNR gain
- Visiting researcher at the Center for Wireless Communications (Oulu, Finland): introduced a novel iterative joint-over-antenna detection technique, improving BER by 3–4 dB
- Contributed to cross-sector projects in time synchronization for wireless time-sensitive networks, ultra-wideband radar for vital sign detection, and adaptive communication systems
- Conducted applied research in signal processing, focusing on BER optimization and wireless protocol development
- Designed and simulated wireless systems using C, MATLAB, and Python, including channel models and performance evaluation frameworks
- Applied AI/ML concepts to signal classification and protocol adaptation (ongoing learning in 2025)

## EDUCATION

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### **University of Southampton, U.K. (2001)**

Doctor of Philosophy (Ph.D.) in Wireless Communications

- Thesis: Genetic algorithm-assisted CDMA multiuser detection

### **Nanyang Technological University, Singapore (1996)**

Bachelor of Engineering (B.Eng) in Electrical and Electronics Engineering (1st class honours)

## AWARDS

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- Public Service Division Long Service Medal (2022)
- Outstanding Maritime R&D and Technology Award (2019)
- Ministry of Transport Minister's Innovation Award (2018)
- Best Presentation in Session in IEEE International Conference on Signal and Image Processing (2017)
- National Science & Technology Board (NSTB) Postgraduate Scholarship (1997)

## CERTIFICATIONS

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- Advanced Professional Certificate in Data Science and AI - NTU, Expected August 2025 (full-time)
- Artificial Intelligence Nanodegree – Udacity (2020)
- Patent Landscaping for Evaluating IP Significance of R&D Outcomes - IPOS (2023)
- Responsible Conduct of Research – CITI Program (2022)
- Numerous certificates in Data Science and AI/ML – LinkedIn Learning

## REFERENCES

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- Available upon request.