

# Curriculum Vitae

Khac-Hoang Ngo

Postdoctoral researcher, Chalmers University of Technology, Sweden

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## 1 Personal Details

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## 2 Education

- July 2017 – June 2020: **Ph.D. in Wireless Communications**

*Institution:* CentraleSupélec, Paris-Saclay University, France

*Thesis:* Noncoherent Wireless Communications: Fundamental Limits and System Design

*Advisors:* Prof. Sheng Yang, Dr. Maxime Guillaud

*Prizes:* Signal, Image & Vision Ph.D. Thesis Prize; “Impact Science” Second Prize

- September 2015 – September 2016: **M.Sc. in Wireless Communications**

*Institution:* CentraleSupélec, Paris-Saclay University, France

*Thesis:* Performance Analysis of Coded Caching

*Advisors:* Prof. Mari Kobayashi, Prof. Sheng Yang

*GPA:* **17.35/20**                      *Class rank:* **1/23**

- August 2010 – June 2014: **B.Sc. in Electronics and Telecommunications**

*Institution:* University of Engineering and Technology (UET), Vietnam National University Hanoi (VNU), Vietnam

*Thesis:* Software-Defined-Radio Implementation of OFDM-based Physical Layer Network Coding

*Advisors:* Assoc. Prof. Nguyen Linh Trung, Assoc. Prof. Nguyen Quoc Tuan

*GPA:* **3.75/4.0**                      *Class rank:* **1/68**

- January 2021 – August 2024 (expected): **Diploma in Teaching and Learning in Higher Education**

*Institution:* Chalmers University of Technology, Sweden

*Courses completed:* Diversity and inclusion for learning in higher education (2 credits), University teaching and learning (2.5 credits), Theoretical perspectives on learning (2.5 credits), Supervising research students (3 credits), Supervising writing processes (2.5 credits)

## 3 Work Experience

### 3.1 Current Employment

- September 2020 – August 2024: **Postdoctoral Researcher**

*Employer:* Communication Systems Group, Department of Electrical Engineering, Chalmers University of Technology, Gothenburg, Sweden

*Advisors:* Prof. Giuseppe Durisi, Prof. Alexandre Graell i Amat

*Job description:* My main duty is to conduct research in the areas of massive random access and decentralized learning, under the Marie Skłodowska-Curie Individual Fellowship project “Low-latency and private edge computing in random-access networks”. I also voluntarily serve as a teaching assistant for master/Ph.D. courses. Furthermore, I am co-supervising a master student and a Ph.D. student.

- March 2021 – present: **Adjunct Lecturer**

*Employer:* Advanced Institute of Engineering and Technology (AVITECH), UET, VNU, Vietnam

*Job description:* I participate in research discussion and proposal writing with other researchers at the Institute.

### 3.2 Previous Employment

- November 2016 – June 2020: **Research Engineer**

*Employer:* Mathematical and Algorithmic Sciences Laboratory, Paris Research Center, Huawei Technologies France

*Advisor:* Dr. Maxime Guillaud

*Job description:* As an industrial Ph.D. student, I conducted research on *noncoherent wireless communications*.

- February 2016 – October 2016: **Research Assistant**

*Employer:* Laboratory of Signals and Systems (L2S), CentraleSupélec, Paris-Saclay University, France

*Advisors:* Prof. Mari Kobayashi, Prof. Sheng Yang

*Job description:* As a research intern (February 2016 – August 2016) and then a research engineer (September 2016 – October 2016), I conducted research on *coded caching* in practical scenarios, namely, 1) with non-uniform demands, 2) with asynchronous and random user arrivals, and 3) in MIMO broadcast downlink channel. This research is within the joint project “Online Coded Caching: Fundamental Limits and Efficient Learning Algorithms” between CentraleSupélec and Huawei Technologies France.

- November 2012 – August 2015: **Research Assistant**

*Employer:* University of Engineering and Technology (UET), VNU, Vietnam

*Advisors:* Assoc. Prof. Nguyen Linh Trung, Assoc. Prof. Nguyen Quoc Tuan

*Job description:* I conducted research on software-defined radio implementation of *network coding* in an OFDM-based two-way relay network and its extension to VFDM-based *cognitive radio*. This research is within the project “Cross-layer cooperative communications for future wireless networks based on network coding” funded by Vietnam Ministry of Science and Technology #39/2012/HD/NDT.

- December 2013 – March 2014: **Intern**

*Employer:* VNPT Technology, Vietnam Posts and Telecommunications Group, Vietnam

*Job description:* I participated in *interface programming* for a VoIP subscriber management website.

- July 2012 – August 2012: **Intern**

*Employer:* Dept. of Electrical and Computer Engineering, National University of Singapore (NUS), Singapore

*Advisor:* Prof. Aaron Danner

*Job description:* As one of the four Vietnamese interns selected for the NUS Undergraduate Research Attachment Programme, I conducted experiments with *solar panels* to analyze their characteristics, design a solar cell circuit to power an indoor robot, and propose the charge controller mechanism.

## 4 Research Funding and Grants

### 4.1 Funded Projects

- 2023 – 2027: **Theory for the Privacy-Security Trade-off in Federated Learning**

*Source:* Wallenberg AI, Autonomous Systems and Software Program (WASP), Sweden

*Amount:* SEK 4,000,000

*Acceptance Rate:* 20%

*Principal Investigator:* Prof. Alexandre Graell i Amat (Chalmers University of Technology)

*Description:* This project aims to quantify the privacy and security guarantees—and their trade-off—of federated learning. Leveraging tools from finite-blocklength information theory, we will address three main challenges: 1) differential privacy metrics for realistic adversaries, 2) the privacy of secure Aggregation, and 3) the trade-off between privacy vs. identification of malicious clients.

*My Role:* I am a co-applicant, together with Dr. Johan Östman (AI Sweden). I participated in the proposal writing from brainstorming to completion. With this project, we recruited a Ph.D. student (Marcus Lassila) who started in September 2023. I serve as a co-supervisor of this student.

- 2021 – 2023: **LANTERN: Low-latency and private edge computing in random-access networks**

*Source:* Marie Skłodowska-Curie Individual Fellowship #101022113

*Amount:* EUR 192,000

*Acceptance Rate:* 12.37%

*Co-Investigator (supervisors):* Prof. Alexandre Graell i Amat and Prof. Giuseppe Durisi (Chalmers University of Technology)

*Description:* With the continuous rise of the Internet of things and the steady spread of connected devices, there is an increasing need concerning private edge computing and connectivity. This project will assist in fulfilling this need by researching low-latency and private edge computing networks and studying ways in which they could be developed in wireless random-access networks. We aim to overcome the challenges of establishing foundations for privacy and reliability in latency-critical, multi-server and multi-client edge computing and in devising resilient coding schemes intertwined with energy-efficient scalable wireless random-access methodologies.

*My Role:* I am the Fellow and Principle Investigator. I took the lead in the proposal writing. With suggestions and comments from the supervisors, I wrote the full proposal.

- **2022 – 2024: Agricultural Internet of Things Based on Edge Computing**

*Source:* ICT Virtual Organization of ASEAN Institutes and Japan’s NICT (ASEAN IVO)

*Amount:* USD 80,000

*Acceptance Rate:* 25%

*Principal Investigator:* Dr. Trong-Minh Hoang (Head of the Telecommunication Networks Department, Post and Telecommunications Institute of Technology, Vietnam)

*Description:* The aim of this project is to develop an IoT-based framework with intelligent computing and implementation for an indoor smart farm. The framework consists of an IoT weather station, plant and soil sensors, a mobile robot with a manipulator, two drones, and edge computing devices. The operation of the proposed system is monitored via a new decentralized security framework, based on anomaly detection, software-defined network, and network function virtualization.

*My Role:* I am a project member. I participated in the proposal writing from brainstorming to completion. I was in charge of one work package on “New intelligent edge computing solutions for data collection and local response control in smart farming”. This is a collaborative project between University of Engineering and Technologies, Vietnam National University Hanoi and Posts and Telecommunications Institute of Technology (Vietnam), Universiti Malaysia Terengganu (Malaysia), National Electronics and Computer Technology Center (Thailand), and National Institute of Information and Communications Technology (Japan).

- **2021 – 2022: Connecting the Unconnected: A Tool for Digital Inclusion**

*Source:* AlumNode Funding, Klaus Tschira Foundation, Germany

*Amount:* EUR 5000

*Principal Investigator:* Mr. Aniq Ur Rahman (University of Oxford, UK)

*Description:* We aim to develop a recommendation system for the optimal network deployment architecture for any given location to bring internet connectivity. Based on the features associated with the region, the recommended network architecture can be an amalgamation of different types of networks, such as free space optical links, TV white space towers, WiFi access points, and fiber connections.

*My Role:* I am a co-applicant, together with Dr. Anish Jindal (Durham University, UK). I participated in the proposal writing from brainstorming to completion. This is funding for joint projects between alumni of the Heidelberg Laureate Foundation (HLF), Germany. As alumni of the HLF 2019, we teamed up, identified a common interest, and wrote the proposal.

## 4.2 Funding Applications under Review

- **2024 – 2028: Theory for the Privacy-Security Trade-off in *Practical* Federated Learning**

*Source:* Swedish Research Council (VR), Sweden

*Amount:* SEK 4,000,000

*Principal Investigator:* Prof. Alexandre Graell i Amat (Chalmers University of Technology)

*Description:* We aim to analyze the impact of practical mechanisms, including regularization, quantization, and sparsification, on the privacy and security of federated learning through a common lens by exploiting the notion of noiseless differential privacy and tools from information theory. These aspects are complementary to the objectives of the WASP project mentioned above.

*My Role:* I am a co-applicant, together with Dr. Johan Östman (AI Sweden). I participated in the proposal writing from brainstorming to completion. With this project, we plan to recruit one Ph.D. student who will start in the beginning of 2024. I will serve as a co-supervisor of this student.

- **2024 – 2026: Improving positioning performance in 5G Mobile Communications Systems**

*Source:* National Foundation for Science and Technology Development (NAFOSTED), Vietnam

*Amount:* USD 40,000

*Principal Investigator:* Dr. Thai-Mai Dinh-Thi (Deputy Head of Telecommunication Systems Department, University of Engineering and Technology, Vietnam National University Hanoi)

*Description:* This project focuses on location-aware applications in fifth generation (5G) communications network. We will conduct a theoretical analysis of lower bound limits (Cramér–Rao bound) and evaluation of fading effect and heteroscedastic environments on the accuracy of indoor and outdoor positioning. Based on this analysis, we will propose methods to mitigate the effects of fading, especially the non-line-of-sight (NLOS) components to enhance the positioning accuracy.

*My Role:* I am a co-applicant, together with Prof. Pierre Duhamel (Paris-Saclay University, France). As an adjunct member of the Advanced Institute of Engineering and Technology, University of Engineering and Technology, I discussed this proposal with the main applicant, and participated in the proposal writing. I am mainly responsible for the theoretical analysis.

## 5 Research Output

### 5.1 Research Interests and Goal

My research interests are in the areas of **wireless communications**, **information theory**, and **decentralized learning**, with an emphasis on massive random access, privacy of federated learning, age of information, MIMO, and noncoherent communications.

My goal is to gain **fundamental insights** into communication and learning systems and to leverage these insights for **practical designs** of communication and learning schemes.

### 5.2 Research Experience

I have more than 10 years of experience in research, from the third year of my bachelor’s study to my current postdoctoral research. In the following, I retrace the main steps in my research career with reference to my list of publications.

My postdoctoral research primarily focuses on **massive random access**, where a large number of sporadically active devices access the wireless medium in an uncoordinated fashion. First, I characterized the energy efficiency achievable under the **unsourced multiple access** (UMA) framework, where the users employ the same codebook, and the decoder returns an unordered list of codewords. Specifically, I extended the random-coding achievability bound in the original UMA framework to the case in which the number of active devices is random and unknown to the receiver [J2], [C7], and to the case with heterogeneous traffic consisting of both standard and critical messages [J1], [C5]. Second, I explored practical **advanced slotted ALOHA protocols**. I analyzed irregular repetition slotted ALOHA (IRSA) over the binary adder channel [C3]. I also investigated information freshness, measured in terms of the **age of information** metric, achieved with IRSA when devices belong to different classes [C6], as well as with slotted ALOHA when devices rely on harvested energy [C2]. Besides massive random access, I also conducted research on edge computing [J3], [C8], reconfigurable intelligent surfaces [C8], joint communication and sensing [C4], mmWave channel estimation [C1], and network deployment for rural connectivity [J5]. Furthermore, I am currently focusing on the **privacy of federated learning**, aiming to quantify the privacy guarantee of secure aggregation (where clients jointly mask their updates to reveal only the aggregate) through the lens of differential privacy.

The topic of my Ph.D. thesis was **noncoherent wireless communications**, where channel state information (CSI) is unavailable a priori. Conventional wireless communication methods involve pilot-based channel estimation and coherent detection. However, when channel estimation is challenging and overconsumes communication resources, adopting communication strategies that operate without relying on CSI, such as using Grassmannian constellations, proves to be more effective. In the first part of the thesis, I characterized the **fundamental limits** of noncoherent communications under generic fading conditions. Specifically, I derived the optimal/achievable degrees of freedom and data rates for the noncoherent point-to-point channel [C11], multiple access channel [C16], and broadcast channel [J6], [C13], [C19]. In the second part, I designed **practical schemes**, including a structured Grassmannian constellation with high packing

efficiency and low mapping/demapping complexity [P1], [J7], [C18]. For the multiple access channel, I proposed meaningful metrics to design joint constellations [J4], [C10], [C12], along with a practical multiple access scheme [C15]. Moreover, I introduced a low-complexity and effective noncoherent multiuser detection scheme based on expectation propagation [J8], [C14]. For nonlinear channels, I presented a generalized Gaussian model to characterize the input-output relation [C9].

My master’s thesis focused on **coded caching**, which reduces the traffic load in content delivery networks by prefetching content near/at the users and by employing coded multicast. I analyzed the performance of coded caching in practical scenarios, considering random demands, random user arrivals, and wireless channels. In MIMO broadcast channels, coded multicast is limited by the channel condition of the worst user, hindering scalability, i.e., the ability to guarantee a constant per-user delivery rate as the user population grows. I proposed methods to achieve scalability based on multiple-antenna transmission or opportunistic user scheduling, uncovering a synergy between coded caching and massive MIMO [J10], [C17], [C20]–[C22].

During my bachelor’s study, I actively engaged in research early by completing a summer internship at the National University of Singapore, focusing on solar panel charge controllers [R1]. Subsequently, I participated in a research project on **network coding**, aiming to increase the network throughput through transmitting message combinations. I implemented network coding and cognitive radio protocols using a real-time software-defined radio testbed with USRP and bladeRF devices [B1]–[B4], [J9], [C23], [C24].

### 5.3 List of Publications

- Google Scholar Profile: <https://scholar.google.com/citations?user=RjcW6WwAAAAJ&hl=en>
- Google Scholar Statistics (updated: 21 Sept. 2023): #citations: **341**, h-index: **10**, i10-index: **12**
- **10** journal papers, **24** conference papers (first-authorships: **23/34**)
- **4** book chapters, **1** patent

#### 5.3.1 Book Chapters

- [B1] L.-T. Nguyen, T.-T.-Q. Tran, **Khac-Hoang Ngo**, and V.-L. Nguyen, “Cognitive physical-layer network coding,” in *Two-Way Relay Communications: Theory and Implementation*, L.-T. Nguyen, N.-Q.-B. Vo, and T.-T.-Q. Tran, Eds., Language: Vietnamese, Hanoi, Vietnam: VNU Publishing House, to be published in 2023, ch. 8.
- [B2] V.-L. Nguyen, **Khac-Hoang Ngo**, T.-T.-Q. Tran, V.-H. Le, and L.-T. Nguyen, “Physical-layer network coding for SDR-based multimedia transmissions,” in *Two-Way Relay Communications: Theory and Implementation*, L.-T. Nguyen, N.-Q.-B. Vo, and T.-T.-Q. Tran, Eds., Language: Vietnamese, Hanoi, Vietnam: VNU Publishing House, to be published in 2023, ch. 10.
- [B3] T.-T.-Q. Tran, **Khac-Hoang Ngo**, V.-L. Nguyen, H.-S. Do, and L.-T. Nguyen, “Setting up an SDR testbed for OFDM systems,” in *Two-Way Relay Communications: Theory and Implementation*, L.-T. Nguyen, N.-Q.-B. Vo, and T.-T.-Q. Tran, Eds., Language: Vietnamese, Hanoi, Vietnam: VNU Publishing House, to be published in 2023, ch. 9.
- [B4] T.-T.-Q. Tran, V.-L. Nguyen, **Khac-Hoang Ngo**, L.-T. Nguyen, Q.-T. Nguyen, V.-H. Le, N.-Q.-B. Vo, and X.-N. Tran, “Implementation of cognitive physical-layer network coding based on OFDM/VFDM,” in *Two-Way Relay Communications: Theory and Implementation*, L.-T. Nguyen, N.-Q.-B. Vo, and T.-T.-Q. Tran, Eds., Language: Vietnamese, Hanoi, Vietnam: VNU Publishing House, to be published in 2023, ch. 11.

#### 5.3.2 Patent

- [P1] **Khac-Hoang Ngo**, A. Decurninge, M. Guillaud, and S. Yang, “Transmitter and receiver communication apparatus for non-coherent communication,” U.S. Patent 17/243,679, 2021.

### 5.3.3 Journal Papers

- [J1] **Khac-Hoang Ngo**, G. Durisi, A. Graell i Amat, P. Popovski, A. E. Kalor, and B. Soret, “Unsourced multiple access with common alarm messages: Network slicing for massive and critical IoT,” *under minor revision to IEEE Transactions on Communications*, Feb. 2023. [Online]. Available: <https://arxiv.org/pdf/2302.11026.pdf>.
- [J2] **Khac-Hoang Ngo**, A. Lancho, G. Durisi, and A. Graell i Amat, “Unsourced multiple access with random user activity,” *IEEE Transactions on Information Theory*, vol. 69, no. 7, pp. 4537–4558, Feb. 2023. DOI: 10.1109/TIT.2023.3248967. [Online]. Available: <https://arxiv.org/pdf/2202.06365.pdf>.
- [J3] G. Gur, A. Kalla, C. de Alwis, Q.-V. Pham, **Khac-Hoang Ngo**, M. Liyanage, and P. Porambage, “Integration of ICN and MEC in 5G and beyond networks: Mutual benefits, use cases, challenges, standardization, and future research,” *IEEE Open Journal of the Communications Society*, vol. 3, pp. 1382–1412, Aug. 2022. DOI: 10.1109/OJCOMS.2022.3195125.
- [J4] **Khac-Hoang Ngo**, S. Yang, M. Guillaud, and A. Decurninge, “Joint constellation design for noncoherent MIMO multiple-access channels,” *IEEE Transactions on Information Theory*, Jul. 2022. DOI: 10.1109/TIT.2022.3189254. [Online]. Available: <https://arxiv.org/pdf/2009.11548.pdf>.
- [J5] A. U. Rahman, F. Fourati, **Khac-Hoang Ngo**, A. Jindal, and M.-S. Alouini, “Network graph generation through adaptive clustering and infection dynamics: A step towards global connectivity,” *IEEE Communications Letter*, vol. 26, no. 4, pp. 783–787, Jan. 2022. [Online]. Available: <https://arxiv.org/pdf/2111.10690.pdf>.
- [J6] F. Zhang, **Khac-Hoang Ngo**, S. Yang, and A. Nosratinia, “Transmit correlation diversity: Generalization, new techniques, and improved bounds,” *IEEE Transactions on Information Theory*, vol. 68, no. 6, pp. 3841–3869, Jan. 2022, (Zhang and Ngo contributed equally to the technical content). [Online]. Available: <https://arxiv.org/pdf/2104.09711.pdf>.
- [J7] **Khac-Hoang Ngo**, A. Decurninge, M. Guillaud, and S. Yang, “Cube-split: A structured Grassmannian constellation for non-coherent SIMO communications,” *IEEE Transactions on Wireless Communications*, vol. 19, no. 3, pp. 1948–1964, Mar. 2020. DOI: 10.1109/TWC.2019.2959781. [Online]. Available: <https://doi.org/10.1109/TWC.2019.2959781>.
- [J8] **Khac-Hoang Ngo**, M. Guillaud, A. Decurninge, S. Yang, and P. Schniter, “Multi-user detection based on expectation propagation for the non-coherent SIMO multiple access channel,” *IEEE Transactions on Wireless Communications*, vol. 19, no. 9, pp. 6145–6161, Sep. 2020. [Online]. Available: <https://arxiv.org/pdf/1905.11152.pdf>.
- [J9] T.-T.-Q. Tran, L. V. Nguyen, **Khac-Hoang Ngo**, L.-T. Nguyen, Q.-T. Nguyen, N.-Q.-B. Vo, X.-N. Tran, E. Bastug, S. Azarian, M. Debbah, and P. Duhamel, “Network coding with multimedia transmission and cognitive networking: An implementation based on software-defined radio,” *REV Journal on Electronics and Communications*, vol. 10, no. 3-4, pp. 72–84, 2020, **Invited Article**. [Online]. Available: <https://centralesupelec.hal.science/hal-03271773v1/document>.
- [J10] **Khac-Hoang Ngo**, S. Yang, and M. Kobayashi, “Scalable content delivery with coded caching in multi-antenna fading channels,” *IEEE Transactions on Wireless Communications*, vol. 17, no. 1, pp. 548–562, Jan. 2018. DOI: 10.1109/TWC.2017.2768361. [Online]. Available: <https://doi.org/10.1109/TWC.2017.2768361>.

### 5.3.4 Conference Papers

- [C1] N.-S. Duong, Q.-T. Nguyen, **Khac-Hoang Ngo**, and T.-M. Dinh-Thi, “Sparse Bayesian learning with atom refinement for mmWave MIMO channel estimation,” in *IEEE Statistical Signal Processing Workshop (SSP)*, Hanoi, Vietnam, Jul. 2023, pp. 155–159. DOI: 10.1109/SSP53291.2023.10208044.
- [C2] **Khac-Hoang Ngo**, G. Durisi, A. Graell i Amat, A. Munari, and F. Lázaro, “Age of information in slotted ALOHA with energy harvesting,” in *IEEE Global Communications Conference (GlobeCom)*, Kuala Lumpur, Malaysia, Dec. 2023. [Online]. Available: [https://research.chalmers.se/publication/537484/file/537484\\_Fulltext.pdf](https://research.chalmers.se/publication/537484/file/537484_Fulltext.pdf).



- [C3] **Khac-Hoang Ngo**, A. Graell i Amat, and G. Durisi, “Irregular repetition slotted ALOHA over the binary adder channel,” in *IEEE International Conference on Communications (ICC)*, Rome, Italy, May 2023. [Online]. Available: <https://arxiv.org/pdf/2302.11720.pdf>.
- [C4] N. T. Nguyen, N. Shlezinger, **Khac-Hoang Ngo**, V.-D. Nguyen, and M. Juntti, “Joint communications and sensing design for multi-carrier MIMO systems,” in *IEEE Statistical Signal Processing Workshop (SSP)*, **Best Paper Award**, Hanoi, Vietnam, Jul. 2023, pp. 110–114. DOI: [10.1109/SSP53291.2023.10207952](https://doi.org/10.1109/SSP53291.2023.10207952).
- [C5] **Khac-Hoang Ngo**, G. Durisi, A. Graell i Amat, P. Popovski, B. Soret, and A. E. Kalør, “Unsources multiple access for heterogeneous traffic requirements,” in *56th Asilomar Conference on Signals, Systems, and Computers*, **Invited Paper**, CA, USA, Oct. 2022.
- [C6] **Khac-Hoang Ngo**, G. Durisi, and A. Graell i Amat, “Age of information in prioritized random access,” in *55th Asilomar Conference on Signals, Systems, and Computers*, **Invited Paper**, CA, USA, Oct. 2021, pp. 1502–1506. DOI: [10.1109/IEEECONF53345.2021.9723286](https://doi.org/10.1109/IEEECONF53345.2021.9723286). [Online]. Available: <https://arxiv.org/pdf/2112.01182.pdf>.
- [C7] **Khac-Hoang Ngo**, A. Lancho, G. Durisi, and A. Graell i Amat, “Massive uncoordinated access with random user activity,” in *IEEE International Symposium on Information Theory (ISIT)*, Melbourne, Victoria, Australia, 2021, pp. 3014–3019. [Online]. Available: <https://arxiv.org/abs/2103.09721>.
- [C8] **Khac-Hoang Ngo**, N. T. Nguyen, T. Q. Dinh, T.-M. Hoang, and M. Juntti, “Low-latency and secure computation offloading assisted by hybrid relay-reflecting intelligent surface,” in *International Conference on Advanced Technologies for Communications (ATC)*, **Best Paper Award**, Hanoi, Vietnam, Oct. 2021, pp. 306–311. [Online]. Available: <https://arxiv.org/pdf/2109.01335.pdf>.
- [C9] **Khac-Hoang Ngo** and S. Yang, “A generalized Gaussian model for wireless communications,” in *IEEE International Symposium on Information Theory (ISIT)*, Melbourne, Victoria, Australia, 2021, pp. 3237–3242. [Online]. Available: <https://research.chalmers.se/en/publication/522211>.
- [C10] **Khac-Hoang Ngo** and S. Yang, “A Riemannian metric for non-coherent constellation design and its application to multiple access channel,” in *25th International ITG Workshop on Smart Antennas*, French Riviera, France, Nov. 2021. [Online]. Available: <https://centralesupelec.hal.science/hal-03420084v1/document>.
- [C11] **Khac-Hoang Ngo**, S. Yang, and M. Guillaud, “The optimal DoF for the noncoherent MIMO channel with generic block fading,” in *2020 IEEE Information Theory Workshop (ITW)*, Riva del Garda, Italy, Apr. 2021. [Online]. Available: <https://arxiv.org/pdf/2009.11556.pdf>.
- [C12] **Khac-Hoang Ngo**, S. Yang, M. Guillaud, and A. Decurninge, “Noncoherent MIMO multiple-access channels: A joint constellation design,” in *2020 IEEE Information Theory Workshop (ITW)*, Riva del Garda, Italy, Apr. 2021. [Online]. Available: [https://centralesupelec.hal.science/hal-03420089/file/ITW2020\\_MAC\\_constellation.pdf](https://centralesupelec.hal.science/hal-03420089/file/ITW2020_MAC_constellation.pdf).
- [C13] **Khac-Hoang Ngo**, F. Zhang, S. Yang, and A. Nosratinia, “Two-user MIMO broadcast channel with transmit correlation diversity: Achievable rate regions,” in *IEEE Information Theory Workshop (ITW)*, Kanazawa, Japan, Nov. 2021. [Online]. Available: <https://centralesupelec.hal.science/hal-03420090/document>.
- [C14] **Khac-Hoang Ngo**, M. Guillaud, A. Decurninge, S. Yang, S. Sarkar, and P. Schniter, “Non-coherent multi-user detection based on expectation propagation,” in *53rd Asilomar Conference on Signals, Systems, and Computers*, CA, USA, Nov. 2019, pp. 2092–2096. [Online]. Available: <https://centralesupelec.hal.science/hal-02556927/document>.
- [C15] **Khac-Hoang Ngo**, A. Decurninge, M. Guillaud, and S. Yang, “A multiple access scheme for non-coherent SIMO communications,” in *52nd Asilomar Conference on Signals, Systems, and Computers*, CA, USA, Oct. 2018, pp. 1846–1850. DOI: [10.1109/ACSSC.2018.8645403](https://doi.org/10.1109/ACSSC.2018.8645403). [Online]. Available: <https://centralesupelec.hal.science/hal-03420091v1/preview/Asilomar2018.pdf>.
- [C16] **Khac-Hoang Ngo**, S. Yang, and M. Guillaud, “The optimal DoF region for the two-user non-coherent SIMO multiple-access channel,” in *IEEE Information Theory Workshop (ITW)*, Guangzhou, China, Nov. 2018. [Online]. Available: <https://arxiv.org/pdf/1806.04102.pdf>.



- [C17] A. Ghorbel, **Khac-Hoang Ngo**, R. Combes, M. Kobayashi, and S. Yang, “Opportunistic content delivery in fading broadcast channels,” in *IEEE Global Communications Conference (GLOBECOM)*, Singapore, Dec. 2017. DOI: 10.1109/GLOCOM.2017.8254966. [Online]. Available: <https://arxiv.org/pdf/1702.02179.pdf>.
- [C18] **Khac-Hoang Ngo**, A. Decurninge, M. Guillaud, and S. Yang, “Design and analysis of a practical codebook for non-coherent communications,” in *51st Asilomar Conference on Signals, Systems, and Computers*, CA, USA, Oct. 2017, pp. 1237–1241. DOI: 10.1109/ACSSC.2017.8335549.
- [C19] **Khac-Hoang Ngo**, S. Yang, and M. Guillaud, “An achievable DoF region for the two-user non-coherent MIMO broadcast channel with statistical CSI,” in *2017 IEEE Information Theory Workshop (ITW)*, Taiwan, Nov. 2017, pp. 604–608. DOI: 10.1109/ITW.2017.8277972.
- [C20] **Khac-Hoang Ngo**, S. Yang, and M. Kobayashi, “Cache-aided content delivery in MIMO channels,” in *54th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, IL, USA, Sep. 2016, pp. 93–100. DOI: 10.1109/ALLERTON.2016.7852215. [Online]. Available: <https://hal.science/hal-01806310/file/hal-01806310.pdf>.
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### 5.3.5 Conference Posters

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- [Po2] **Khac-Hoang Ngo**, “Age of information in prioritized random-access,” in *IEEE SPS - EURASIP Summer School on “Defining 6G: Theory, Applications, and Enabling Technologies”*, Linköping, Sweden, Aug. 2022.
- [Po3] **Khac-Hoang Ngo**, “Massive uncoordinated access for the Internet of Things: A novel information theoretic framework,” in *9th Heidelberg Laureate Forum (HLF)*, Heidelberg, Germany, Sep. 2022.
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### 5.3.6 Technical Report

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### 5.3.7 Theses

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## 6 Research Supervision

I have co-supervised two master group research projects at CentraleSupélec, Paris-Saclay University, France. In this capacity, I worked closely with the students to 1) clarify research problems and objectives, 2) direct the students toward useful resources like research papers and books, 3) conduct weekly meetings with the students to keep track of their progress, provide comments and guidance, and agree on the action points for the coming week, and 4) give feedback on their final written reports.

Since September 2023, I have been co-supervising a master’s student and a Ph.D. student at Chalmers University of Technology. I will also serve as co-supervisor for a prospective Ph.D. student, subject to the funding application to the Swedish Research Council (VR) mentioned in Section 4.2.

The list of my on-going and past supervisions is given below.

- 2023 – 2027: **Theory for the privacy-security trade-off in federated learning** (Ph.D. thesis)  
*Student:* Marcus Lassila  
*Main supervisor:* Prof. Alexandre Graell i Amat  
*University:* Chalmers University of Technology, Sweden  
*Funding:* Wallenberg AI, Autonomous Systems and Software Program (WASP)
- September 2023 – August 2024: **Learning joint detection and decoding in short-packet communications** (master’s thesis, 60 credits)  
*Student:* Xi Zhang  
*Main supervisor:* Prof. Giuseppe Durisi  
*University:* Chalmers University of Technology  
*Program:* M.Sc. in Information and Communications Technologies
- March 2021: **MIMO detection under the generalized Gaussian model** (master’s research project, 5 credits)  
*Students:* Khodor Safa and Shanglin Yang  
*Main supervisor:* Prof. Sheng Yang  
*University:* CentraleSupélec, Paris-Saclay University, France  
*Program:* M.Sc. in Advanced Wireless Communication Systems
- Feb – March 2021: **Embracing non-linearities in future wireless systems via nonconvex optimization** (master’s research project, 5 credits)

*Students:* Wassim Khelil, Mohamed Idriss Khaledi, and Anas Ouallou

*Main supervisor:* Prof. Sheng Yang

*University:* CentraleSupélec, Paris-Saclay University, France

*Program:* M.Sc. in Advanced Wireless Communication Systems

## 7 Teaching Merits

### 7.1 Pedagogical Training

I am pursuing a **diploma in teaching and learning in higher education** at Chalmers University of Technology. I have successfully completed five courses listed below, accumulating a total of 12.5 credits.

- 2021: CLS930—**Diversity and inclusion for learning in higher education** (2 credits)

*Goals:* The course shows a reflective approach to teaching and an ability to treat students inclusively. This means recognizing and explaining the variety and complexity among individual learners within the classroom environment and critically evaluating learning activities in terms of diversity.

*Reflection:* The course helped me to be better aware of the importance of maintaining diversity and methods to treat students inclusively. At the end of the course, I reflected on three teaching activities that foster diversity and inclusion: 1) organize student group work, 2) use inclusive language and avoid stereotyping, and 3) diversify the course content with a social context and guest lectures.

- 2021: CLS925—**University teaching and learning** (2.5 credits)

*Goals:* The course aims to help participants: 1) to develop teaching skills; 2) to gain a better understanding of the principles and practice of effective teaching (such as constructive alignment) in different teaching situations in higher education; and 3) to start think about their teaching practice and development in a structured and scholarly fashion.

*Reflection:* I chose three concepts discussed in the course that will have influence in my practice: 1) blended learning, flipped classrooms, 2) using assessment strategically, and 3) teaching problem solving. With reference to these concepts, I reflected on my teaching in the course Information Theory, including what has gone well and what could be improved.

- 2020: CLS900—**Theoretical perspectives on learning** (2.5 credits)

*Goals:* Participants are expected to gain awareness of different theoretical perspectives on learning and increase their ability to use these perspectives to develop their teaching practice in support of student learning.

*Reflection:* I recognized that I have been mostly educated following the behaviorist framework. Although it worked well for me, I realized that I need to step out of the behaviorist mindset and incorporate the cognitive and situated framework in my teaching.

- 2021: CLS905—**Supervising research students** (3 credits)

*Goals:* The course aims to help participants to 1) develop and reflect upon their (new) role as supervisor for research students; 2) gain basic knowledge about the goals and regulations for doctoral studies; and 3) gain a better understanding of the principles and practices of good supervision during the different phases of the research study process.

*Reflection:* I set goals to help my future students acquire the essential skills and knowledge required for high-quality and in-depth professional work, and to reach maturity and independence in research. I listed some supervisory practices that will help me achieve this goal, in terms of a good relationship with the student, student's gradual independence transition, supervision meetings, writing development, and publication.

- 2021: CLS910—**Supervising writing processes** (2.5 credits)

*Goals:* The course is offered as a seminar oriented towards supervision of writing through active learning. The series of seminars is designed for teachers at Chalmers who want to enhance their BSs and MSC supervision practice and their writing pedagogy.

*Reflection:* I reflected on my strengths and weaknesses in supervising writing processes, as well as what to do in my future supervision.

I am following the following course, which together with a reflection essay on teaching and learning in higher education will allow me to fulfil the requirements of the diploma.

- 2023: CLS937—**Pedagogical Project** (4.5 credits)

*Goals:* The course aims to develop the ability to critically examine selected aspects of educational practice from a pedagogical and scientific perspective. The pedagogical project should discuss a specific area of higher education.

## 7.2 Teaching Experience

Despite teaching not being a duty of postdoctoral researchers at Chalmers University of Technology, I voluntarily served as a **teaching assistant** in different instantiations of three master's/Ph.D. courses: 1) Information Theory, 2) Wireless Communications, and 3) Statistics and Machine Learning in High Dimensions. These courses were taught in English.

- Spring 2023: SSY135—**Wireless Communications** (7.5 credits, 20 students)

*Primary lecturer:* Prof. Henk Wymeersch

*Course level:* master's course

*Teaching format:* in-person, combination of normal and flipped-classroom lectures

*Examination format:* quizzes, MATLAB projects, midterm oral exam, final written exam

*Description:* The course provides students with a technical understanding of wireless communication systems, including the wireless channel, signal design choices, and algorithms in current wireless communication standards. The course covers basic propagation models, multi-carrier, multi-antenna, and multi-user communication, as well as 5G and beyond 5G communication systems.

*My role:*

- \* I prepared five **exercise sessions** and oversaw three of them (6 hours) in the classroom. Each session consists of problem-solving and multiple-choice quizzes.
- \* I answered students' questions in the classroom, via emails, and during in-person discussions in my office.
- \* I gave two **flipped-classroom lectures** (2 hours) on multi-user communications and MIMO communications. Before these sessions, the students are requested to watch recorded lectures. During the sessions, I briefly recap the lecture content, then let students discuss in pairs multiple-choice questions. I then take their answers and discuss the correct answer as well as misconceived answers. These activities promote active learning and solidify the students' understanding of the lecture.
- \* I manage a **group project** in which the students simulate wireless fading channels using MATLAB. I explained the tasks, answered students' questions, and graded their reports. This project trains the students in general skills including teamworking, communication, leadership, as well as technical skills of programming in MATLAB and writing using LaTeX.
- \* I examined students during an **oral exam** in the middle of the course, covering all details about the project and aspects of the courses up to the date of the exam. This exam provides timely assessment.
- \* Together with the other teaching assistant, I prepared the **final exam** questions and graded the students' answers.

- \* Together with the primary lecturer, I reviewed the course and discussed **enhancement strategies** based on the **course evaluation** returned by the students. We agreed on some improvements including a restructure of the lectures to add one lecture on topics in 6G, and reformed activities in the flipped classroom.
- Spring 2021, Spring 2023: SSY210—**Information Theory** (7.5 credits, 20 students)
 

*Primary lecturer:* Prof. Giuseppe Durisi

*Course level:* advanced, for master's/Ph.D. students

*Teaching format:* online via Zoom (2021), in-person (2023)

*Examination format:* final oral exam

*Description:* This course offers an introduction to information theory and its application to digital communication, statistics, and machine learning. One important feature of the information-theory approach is its ability to provide fundamental results, i.e., results that demonstrate the optimality of certain procedures. Obtaining results of this flavor is useful for many reasons: for example, we can assess whether achieving a target error probability in the transmission of information is feasible; we can determine how many data samples need to be collected to distinguish between two or more statistical hypotheses, or how many examples are needed to train a machine learning algorithm.

*My role:*

  - \* I prepared and gave 8 **exercise sessions** (16 hours) in Spring 2021 and 2 exercise sessions (4 hours) in Spring 2023. In each session, I encouraged students' active participation by letting the students present their solutions to the class, and then giving necessary comments, corrections, and discussions. I applied my expertise in information theory, relating the exercises to relevant research problems. Based on the feedback from Spring 2021, we decided to reduce the number of exercises in each session in Spring 2023.
  - \* I participated in examining the students in the **final oral exam** in Spring 2021. In this oral exam, each student is given randomly one theoretical topic and one homework exercise. Then, they have 30 minutes to prepare before presenting the given topic and exercise.
- Fall 2021, Fall 2022: EEN100—**Statistics and Machine Learning in High Dimensions** (7.5 credits, 12 students)
 

*Primary lecturer:* Prof. Giuseppe Durisi

*Course level:* advanced, for master's/Ph.D. students

*Teaching format:* online via Zoom (2021), in-person (2022)

*Examination format:* final oral exam

*Description:* The explosion in the volume of data collected in all scientific disciplines and in the industry requires students interested in statistical analyses and machine-learning and signal-processing algorithms to acquire more sophisticated probability tools than the ones taught in basic probability courses. This course introduces the area of high-dimensional statistics, which deals with large-scale problems where both the number of parameters and the sample size are large. The course covers fundamental tools for the analysis of random vectors, random matrices, and random projections, such as tail bounds and concentration inequalities. It further provides concrete applications of such tools in the context of generalization-error analyses in statistical learning theory, sparse linear models, and matrix models with rank constraints.

*My role:*

  - \* I prepared and gave 4 **exercise sessions** (8 hours) in both Fall 2021 and Fall 2022. In each session, I encouraged students' active participation by letting the students present their solutions to the class, and then giving necessary comments, corrections, and discussions.
  - \* In Fall 2022, to ensure that the students (attempt to) solve the exercises, I requested each group to submit their solutions before the session.

## 8 Leadership Experience

I have showcased my leadership through multiple initiatives, including the following.

- I am a **founding member and administrator of telecom-vn**, a group of Vietnamese researchers in telecommunications. I recognized the potential of Vietnamese researchers in this field, evidenced by the presence of Vietnamese professors in various international universities and leading engineers in big companies, as well as Vietnamese students studying in electrical engineering in many countries. However, we lacked an online platform to connect, exchange knowledge, and discuss about research. Therefore, together with three other young Vietnamese researchers, I founded this group in Facebook and serve as an administrator. Currently, the group has 315 members including master's and Ph.D. students, postdoctoral researchers, as well as professors all around the world. We maintain research discussion and organize seminars.
- As a member of the Global Vietnamese Young Scholars Association, I **organized online workshops for scientific development** among youths in Vietnam, including “Data Science, Machine Learning, and Artificial Intelligence in Digital Transformation”, November 2021; “ICT Convergence - Shaping the Future of Vietnam”, October 2020; and “Preparing for Tomorrow” about career paths in science and technology for high-school students in Vietnam, November 2021.
- During my Ph.D. study, I joined the initiatives of **organizing the first edition of the Junior Conference on Wireless & Optical Communications**, Paris-Saclay University, France, February 2019. This event gave students the opportunity to present their internship or first-year thesis scientific work and develop their critical thinking skills. We planned the program, advertised the event, selected presentations, invited keynote speakers from Orange Labs and Nokia Bell Labs, and executed this one-day event.
- During my master's study, I joined the initiatives of **organizing the first edition of the Honda Forum for Young Engineers and Scientists**, Tokyo, Japan, November 2015. This forum engaged young scientists and engineers from Japan and other Asian countries in discussions on their recognition of regional issues, the role of science and technology in resolving these issues, and the development of collaborative ties across boundaries. We encouraged the active participation of students from developing countries in South East Asia, which constitute an underrepresented group in Japanese universities.
- During my bachelor's study, I served as the **vice president of the student association** of the university, the **president of a student club** on presentation skills, and a **class representative**. I demonstrated my leadership in organizing various student activities.

## 9 Awards, Honours, and Certificates

- **Qualification for the functions of university professor/lecturer**, National Council of Universities (CNU), France 2023  
The application for this qualification is evaluated by the members of the National Council of Universities (CNU), France. The evaluation relies on two referee reports based on a set of tangible criteria, including the quality of the teaching and research profile. Each year, about 46% of applicants are qualified and authorised to candidate for professor/lecturer positions in French universities.
- **Best Paper Award**, IEEE Statistical Signal Processing Workshop (SSP), Hanoi, Vietnam 2023
- Featured in the **spotlight** of the 9<sup>th</sup> Heidelberg Laureate Forum, Germany 2022
- **Marie Skłodowska-Curie Actions** Individual Fellowship 2021
- **Best Paper Award**, International Conference on Advanced Technologies in Communications (ATC), Vietnam 2021
- **Signal, Image & Vision Ph.D. Thesis Prize** by EEA, GRETSI and GdR-ISIS, France 2021
- **“Impact Science” Second Prize** for Ph.D. thesis, CentraleSupélec Foundation, France 2021



- **Romberg Grant** for selected participants of the 7<sup>th</sup> Heidelberg Laureate Forum, Germany 2019
- **10-out-of-200 list of participants** of the 7<sup>th</sup> Heidelberg Laureate Forum, Germany 2019
- **Graduate with first-class honors** (Master level), CentraleSupélec, France 2016
- **Université Paris-Saclay scholarship** for international Master students 2015–2016
- **Graduate with first-class honors** (Bachelor level), University of Engineering and Technology, Vietnam National University Hanoi 2014
- **Excellent Undergraduate Thesis Award**, University of Engineering and Technology, Vietnam National University Hanoi 2014
- **Third Prize**, Undergraduate Scientific Research Contest, University of Engineering and Technology, Vietnam National University Hanoi 2014
- **Honda Young Engineers and Scientists Award**, Honda Foundation, Japan 2013  
Awarded to 10 selected students from top 6 Vietnamese universities in natural science, engineering and technology
- **Undergraduate Research Attachment Programme Grant**, National University of Singapore, Singapore 2012
- **Shinnyo scholarship**, Shinnyo-en Organization, Japan 2010–2014 (annually)
- **Vallet scholarship**, Rencontres du Vietnam 2011  
Awarded to 138 outstanding students from the north of Vietnam; granted by Prof. Odon Vallet, France.
- **Second Prize** in Physics and **Fourth Prize** in Mathematics in provincial contest for high-school students 2010

## 10 Invited Talks

- **Unsourced Multiple Access for the Internet of Things**
  - H2020 INCOMING Summer School, Gothenburg, Sweden, June 2022
- **Unsourced Multiple Access: An Information-Theoretic Analysis**
  - Linköping University, Sweden, 11 October 2023
  - Advanced Institute of Engineering and Technology (AVITECH), UET, VNU, Vietnam, 22 May 2023
  - National Institute for Research in Digital Science and Technology (INRIA), Lyon, France, 20 April 2023
  - CentraleSupélec, Paris-Saclay University, France, 19 January 2023
- **Unsourced Multiple Access With Common Alarm Messages: Network Slicing for Massive and Critical Internet of Things**
  - Zugspitze Workshop on Communications, Zugspitze, Germany, 24 January 2023
  - Equipe Traitement de l'Information et Systèmes (ETIS), France, 11 October 2022
- **Age of Information in Prioritized Random Access With Energy Harvesting**
  - German Aerospace Center (DLR), Munich, Germany, 28 September 2022
- **Noncoherent Wireless Communications: Fundamental Limits and System Design**
  - 28<sup>th</sup> Francophone Symposium on Signal and Image Processing (GRETSI), France, 08 September 2022
  - Scientific Council Meeting, CentraleSupélec Foundation, France, 06 December 2021

- 60<sup>th</sup> Annual Congress of Teachers-Researchers Club in Electronics, Electrotechnics and Automation (Club EEA), France, 11 June 2021
- Doctoral Students Day, CentraleSup élec, Paris-Saclay University, France, 28 June 2018
- Faculty of Electronics and Telecommunications, UET, VNU, Vietnam, 11 November 2017
- **Massive Uncoordinated Random Access for the Internet of Things**
  - Advanced Institute of Engineering and Technology (AVITECH), UET, VNU, Vietnam, 11 May 2021
- **Constellation Design for Noncoherent Communications in SIMO Block-Fading Channel**
  - Advanced Institute of Engineering and Technology (AVITECH), UET, VNU, Vietnam, 27 August 2019
- **An Achievable DoF Region for the Two-User Noncoherent MIMO Broadcast Channel with Statistical CSI**
  - Technical University of Munich, Germany, 22 September 2017
- **On the Complementary Roles of Massive MIMO and Coded Caching**
  - Laboratory of Signals and Systems, UET, VNU, Vietnam, 25 August 2016

## 11 Professional Service

### 11.1 Memberships in Scientific Communities

- Institute of Electrical and Electronics Engineers (IEEE) (Student Member 2017, Member 2020), including IEEE Information Theory Society, IEEE Communications Society, IEEE Signal Processing Society, and IEEE Young Professionals
- Association for Computing Machinery (ACM) (since 2022)

### 11.2 Editorship

- **Copyeditor** for *ICT Research Journal*, Vietnam Ministry of Information and Communications 2021

### 11.3 Refree for Research Grant Applications

- National Foundation for Science and Technology Development (NAFOSTED), Vietnam, 2023

### 11.4 Refree for International Journals (number of reviews returned)

- IEEE Transactions on Information Theory (4)
- IEEE Transactions on Wireless Communications (69)
- IEEE Transactions on Communications (20)
- IEEE Transactions on Vehicular Technology (14)
- IEEE Transactions on Signal Processing (2)
- IEEE Transactions on Signal and Information Processing over Networks (1)
- IEEE Internet of Things Journal (1)
- IEEE Journal on Selected Areas in Information Theory (2)
- IEEE Journal on Selected Areas in Communications (3)
- IEEE Communications Letter (6)

- IEEE Wireless Communications Letter (10)
- IEEE Vehicular Technology Magazine (3)
- IET Electronics Letter (1)
- Elsevier Pervasive Mobile Computing (1)

### 11.5 Refree for Domestic Journals

- ICT Research Journal, Vietnam Ministry of Information and Communications
- VNU Journal of Science: Computer Science and Communication Engineering, Vietnam

### 11.6 Refree for International Conferences

- IEEE International Symposium on Information Theory (ISIT): 2020, 2022, 2023
- IEEE Information Theory Workshop (ITW): 2018, 2021
- IEEE Global Communications Conference (GLOBECOM): 2017, 2023
- IEEE International Conference on Communications (ICC): 2017, 2018
- IEEE Wireless Communications and Networking Conference (WCNC): 2022
- IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC): 2019
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP): 2023
- IEEE Statistical Signal Processing Workshop (SSP): 2023
- International Symposium on Topics in Coding (ISTC): 2018
- Asilomar Conference on Signals, Systems, and Computers: 2021, 2022, 2023
- International Symposium on Wireless Communication Systems (ISWCS): 2018, 2021
- International Symposium on Communication and Information Technology (ISCIT): 2019
- International ITG Workshop on Smart Antennas (WSA): 2021, 2023
- International Conference on Advanced Technologies in Communications (ATC): 2021, 2022, 2023
- IEEE-RIVF International Conference on Computing and Communication Technologies: 2022
- NAFOSTED Conference on Information and Computer Science (NICS): 2018
- APSIPA Annual Summit and Conference: 2022, 2023
- International Conference on Control, Automation and Information Sciences (ICCAIS): 2023

### 11.7 Technical Program Committee Member for Conferences

- International Conference on Control, Automation and Information Sciences (ICCAIS), 2023
- APSIPA Annual Summit and Conference, 2023
- 12th International Symposium on Information and Communication Technology (SoICT), Hanoi, Vietnam, December 2023
- Joint EuCNC & 6G Summit, Gothenburg, Sweden, June 2023
- 26th International ITG Workshop on Smart Antennas & 13th Conference on Systems, Communications, and Coding (WSA&SCC 2023), Braunschweig, Germany, February 2023
- 11th International Symposium on Information and Communication Technology (SoICT), Hanoi, Vietnam, December 2022

## 11.8 Organizing Committee Member for Conferences

- Communication track chair, International Conference on Advanced Technologies in Communications (ATC), Hanoi, Vietnam, October 2022
- Track chair, 1st International Conference on Intelligence of Things (ICIT), Hanoi, Vietnam, August 2022
- Hot-topic panel discussion organizer, IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), Belfast, UK, June 2022
- Special session organizer, 25th International ITG Workshop on Smart Antennas (WSA), France, November 2021
- Special session organizer, International Conference on Advanced Technologies in Communications (ATC), Hochiminh City, Vietnam, October 2021
- Scientific committee member, 1st Junior Conference on Wireless & Optical Communications, Paris-Saclay University, France, February 2019
- Executive committee member, 1st Honda Forum for Young Engineers and Scientists, Tokyo, Japan, November 2015

## 11.9 Organizing Volunteer for Conferences

- IEEE International Symposium on Information Theory (ISIT), Paris, France, July 2019
- IEEE International Conference on Communications (ICC), Paris, France, June 2017

# 12 Contribution to Society

## 12.1 Promoting Open Science and Research

- Most of my research papers are available on open-access platforms such as arXiv, hal.science, and university websites.
- Reproducible research: the codes to produce numerical results of some of my papers are available at <https://github.com/khachoang1412>

## 12.2 Promoting Popular Science

- I organized **online workshops** for the Vietnamese community:
  - Online workshop “Data Science, Machine Learning, and Artificial Intelligence in Digital Transformation”, November 2021
  - Online workshop “Preparing for Tomorrow” about career paths in science and technology for high-school students in Vietnam, November 2021
  - Online workshop “ICT Convergence - Shaping the Future of Vietnam”, October 2020
- I gave an online **popular science lecture** “Wireless Communications: Basics and Applications” to around 120 Vietnamese attendees in June 2020. The purpose of the lecture was to provide a general understanding of a wireless communication system and its application in real life. Since the audience might not have an engineering background, I avoided using mathematical equations. Instead, I explained the concepts via illustrative examples.
- I gave a **flash presentation** about massive uncoordinated access in the Internet of Things to around 200 attendees with backgrounds in computer science and mathematics at the 9th Heidelberg Laureate Forum, Germany, September 2022. The purpose of this presentation was to introduce the topic and attract the audience to a poster session that took place afterward. During the limited time, I tried to grasp attention quickly by raising a question, using words that drive engagement, and showing my enthusiasm for the topic.

## 12.3 Developing Research Community

- I am a **founding member and administrator of telecom-vn** – a Facebook group for Vietnamese researchers in telecommunications. Through this platform, we organize seminars and maintain research discussions. Some seminars were recorded here: <https://www.youtube.com/@telecom-vn3811>

## 12.4 Scientific Forums

I participated in scientific forums for young scientists and am a member of their alumni networks

- 7th and 9th Heidelberg Laureate Forum, Germany, September 2019 and September 2022
- 2nd and 3rd Global Young Vietnamese Scholars Forum, Vietnam, November 2019 and November 2020
- Honda Young Engineers and Scientists (Y-E-S) Forum, Tokyo, Japan, November 2015; Young Engineers and Scientists Tokyo Meeting, Tokyo, Japan, November 2014. These events were organized by the Honda Foundation to foster the development of young engineers and scientists in Asia.

## 12.5 Appearing in the Media

- An interview in the spotlight of the 9th Heidelberg Laureate Forum about my research and the challenges in the field of telecommunications: <https://scilogs.spektrum.de/hlf/hlff-spotlight-9th-hlf-2>
- An interview with the French National Doctoral Network about my PhD journey: <https://www.docteurs-spi.org/post/khac-hoang-ngo-marie-sk%C5%82odowska-curie-actions-fellow-chalmers-university>
- An interview in the 10-out-of-200 list of participants of the 7th Heidelberg Laureate Forum about scientific research: <https://scilogs.spektrum.de/hlf/10-out-of-200-serving-the-people-khac-hoang-ngo-improves-our-telecommunication/>
- Various Vietnamese newspapers

## 13 Language Skills

- Vietnamese: native
- English: fluent
- French: elementary
- Swedish: beginner

## 14 References

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