



Khac-Hoang NGO

Curriculum Vitae

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🇻🇳 Vietnamese

📁 Research Interests

Wireless Communications, Information Theory

Topics: MIMO, noncoherent communications, edge computing, massive random access, coded caching, network coding

🎓 Education

CentraleSupélec, University of Paris-Saclay, France

Ph.D. in WIRELESS COMMUNICATIONS, July 2017– June 2020
Thesis: Noncoherent Wireless Communications: Fundamental Limits and System Design
Advisors: Prof. Sheng Yang, Dr. Maxime Guillaud

M.Sc. in WIRELESS COMMUNICATIONS, Sept. 2015–Sept. 2016
GPA: 17.35/20, *Class rank:* 1/23, *Grade:* Très Bien (High Distinction)
Thesis: Performance Analysis of Coded Caching
Advisors: Prof. Mari Kobayashi, Prof. Sheng Yang

Univ. of Engineering and Technology (UET), Vietnam National University - Hanoi (VNU), Vietnam

B.Eng. in ELECTRONICS AND TELECOMMUNICATIONS, Aug. 2010–June 2014
GPA: 3.75/4.0, *Class rank:* 1/68, *Grade:* High Distinction
Thesis: Software-Defined-Radio Implementation of OFDM-based Physical Layer Network Coding
Advisors: Assoc. Prof. Nguyen Linh Trung, Assoc. Prof. Nguyen Quoc Tuan

👜 Professional Experience

- **Communication System Group, Dept. Electrical Engineering, Chalmers University of Technology**
POSTDOCTORAL RESEARCHER Sept. 2020–present
Low-latency and private edge computing in random-access networks
- **Mathematical and Algorithmic Sciences Lab., Paris Research Center, Huawei Technologies France**
PH.D. ENGINEER Nov. 2016–June 2020
Noncoherent wireless communications
- **Laboratory of Signals and Systems (L2S) - CentraleSupélec, France**
RESEARCH ENGINEER Sept. 2016–Nov. 2016
RESEARCH STUDENT Feb. 2016–Sept. 2016
Performance analysis of coded caching in practical scenarios; Content delivery with coded caching in MIMO fading broadcast channels
Project: Online Coded Caching: Fundamental Limits and Efficient Learning Algorithms
- **Univ. of Engineering and Technology (UET), VNU, Vietnam**
RESEARCH ASSISTANT July 2014–Aug. 2015
RESEARCH STUDENT Nov. 2012–June 2014
Software-defined radio implementation of network coding and cognitive radio
Project: Cross-layer cooperative communications for future wireless networks based on network coding (39/2012/HD/NDT)
- **VNPT Technology, Vietnam Posts and Telecommunications Group, Vietnam**
INTERN Dec. 2013–Mar. 2014
Website interface programming
- **Dept. of Electrical and Computer Engineering, National University of Singapore (NUS), Singapore**
SUMMER INTERN July 2012–Aug. 2012
Solar panel charge controller
Advisor: Dr. Aaron Danner

Publications

Google Scholar Profile: scholar.google.fr/citations?user=RjcW6WwAAAAJ

ResearchGate Profile: researchgate.net/profile/Khac_Hoang_Ngo

Number of citations (until Sept. 28, 2020): **134** h-index: **6**

Journal papers

1. Khac-Hoang Ngo, A. Decurninge, M. Guillaud, and S. Yang, "Cube-split: A structured Grassmannian constellation for non-coherent SIMO communications," *IEEE Trans. Wireless Commun.*, **19**, (3), 1948–1964, Mar. 2020.
2. 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 Trans. Wireless Commun.*, **19**, (9), 6145–6161, Sep. 2020.
3. Khac-Hoang Ngo, S. Yang, and M. Guillaud, "The optimal degrees of freedom for the point-to-point and multiple-access channels in generic block fading," *in preparation to submit to IEEE Trans. Inf. Theory*, 2020.
4. Khac-Hoang Ngo, S. Yang, M. Guillaud, and A. Decurninge, "Joint constellation design for non-coherent MIMO multiple-access channels," *submitted to IEEE Trans. Inf. Theory*, 2020.
5. F. Zhang, Khac-Hoang Ngo, S. Yang, and A. Nosratinia, "Transmit correlation diversity: Generalization, new techniques, and improved bounds," *submitted to IEEE Trans. Inf. Theory*, 2020, (Zhang and Ngo contributed equally to the technical content).
6. Khac-Hoang Ngo, S. Yang, and M. Kobayashi, "Scalable content delivery with coded caching in multi-antenna fading channels," *IEEE Trans. Wireless Commun.*, **17**, (1), 548–562, Jan. 2018.

Preprints

1. Khac-Hoang Ngo, S. Yang, M. Guillaud, and A. Decurninge, "Joint constellation design for the two-user non-coherent multiple-access channel," *arXiv preprint arXiv:2001.04970*, 2020.

Conference papers

1. Khac-Hoang Ngo, S. Yang, and M. Guillaud, "The optimal DoF for the noncoherent MIMO channel with generic block fading," *in submitted to IEEE Information Theory Workshop (ITW) 2020*, Sep. 2020. <https://arxiv.org/pdf/2009.11556.pdf>.
2. Khac-Hoang Ngo, S. Yang, M. Guillaud, and A. Decurninge, "Noncoherent MIMO multiple-access channels: A joint constellation design," *in submitted to IEEE Information Theory Workshop (ITW) 2020*, Sep. 2020.
3. 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.
4. 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*, Oct. 2018, pp.1846–1850.
5. 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. <https://arxiv.org/pdf/1806.04102.pdf>.
6. 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, pp.1–6. <https://arxiv.org/pdf/1702.02179.pdf>.
7. 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.
8. 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.

9. **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.
10. **Khac-Hoang Ngo**, S. Yang, M. Kobayashi, and K. Huang, "On the complementary roles of massive MIMO and coded caching for content delivery," in *International Conference on Advanced Technologies for Communications (ATC)*, Hanoi, Vietnam, Oct. 2016, pp.237–242.
11. S. Yang, **Khac-Hoang Ngo**, and M. Kobayashi, "Content delivery with coded caching and massive MIMO in 5G," in *9th International Symposium on Turbo Codes and Iterative Information Processing (ISTC)*, Brest, France, Sep. 2016, pp.370–374.
12. **Khac-Hoang Ngo** and Quoc-Tuan Nguyen, "Implementation of network coding scheme in universal software radio peripheral," in *IEICE International Conference on Integrated Circuits, Design, and Verification (ICDV)*, Hanoi, Vietnam, Nov. 2014.
13. Thai-Mai Dinh Thi, Quoc-Tuan Nguyen, and **Khac-Hoang Ngo**, "Implementation of spectrum sensing scheme in software-defined radio testbed," in *IEICE International Conference on Integrated Circuits, Design, and Verification (ICDV)*, Hanoi, Vietnam, Nov. 2014.

Conference posters

1. **Khac-Hoang Ngo**, S. Yang, and M. Guillaud, "Generalized gaussian model for data-driven learning in communications," in *International Zurich Seminar on Information and Communication (IZS)*, Zurich, Switzerland, Feb. 2020.
2. T. T. Q. Tran, V.-L. Nguyen, **Khac-Hoang Ngo**, L.-T. Nguyen, Q.-T. Nguyen, E. Bastug, S. Azarian, M. Debbah, and P. Duhamel, "Network coding and information security in industry 4.0," in *1st ASEAN IVO Workshop on Cybersecurity and Information Security in Industry 4.0*, Hanoi, Vietnam, Mar. 2019.

Technical reports

1. T. T. Q. Tran, V.-L. Nguyen, **Khac-Hoang Ngo**, L.-T. Nguyen, Q.-T. Nguyen, E. Bastug, S. Azarian, M. Debbah, and P. Duhamel, "Network coding with multimedia transmission and cognitive networking: An implementation based on software-defined radio," Vietnam, Technical Report for Project 39/2012/HD/NDT, 2015.
2. **Khac-Hoang Ngo**, "Solar panel charge controller," Dept. of Electrical and Computer Engineering, National University of Singapore, Singapore, Internship report, Aug. 2012.

Patents

1. **Khac-Hoang Ngo**, A. Decurninge, M. Guillaud, and S. Yang, "Transmitter and receiver communication apparatus for non-coherent communication," European Patent Application No. 6860390, Oct. 2018.

Professional Activities

Organizing Committee

- Junior Conference on Wireless and Optical Communications, Univ. of Paris-Saclay, France, 19 Feb. 2019
- Young Engineers and Scientists Forum, Honda Foundation, Japan, 18 Nov. 2015

Membership

- **Student Member** of IEEE, IEEE Information Theory Society, IEEE Communications Society, and IEEE Signal Processing Society
- **Associate Member** of the Advanced Institute of Engineering and Technology, UET, VNU, Vietnam

Editorship

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

Reviewer

International Journals

- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Communications
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Signal and Information Processing over Networks
- IEEE Transactions on Signal Processing
- IEEE Journal on Selected Areas in Communications
- IEEE Communications Letters
- IEEE Wireless Communications Letters
- IEEE Vehicular Technology Magazine

Domestic Journals

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

International Conferences

- 2017: IEEE GLOBECOM, IEEE ICC
- 2018: IEEE ICC, ISWCS, IEEE ITW, ISTC, NICS
- 2019: IEEE SPAWC, ISCT
- 2020: IEEE ISIT

Supervision

- Wassim KHELIL, Mohamed Idriss KHALEDI, and Anas OUALLOU, "Embracing non-linearities in future wireless systems via non-convex optimization," *Master student research project, CentraleSupélec*, 01/02–31/03/2020

Talks

- "Constellation Design for Noncoherent Communications in SIMO Block-Fading Channel," *Advanced Institute of Engineering and Technology (AVITECH), UET, VNU, Vietnam*, 27 Aug. 2019
- "Noncoherent Wireless Communications: Theoretical Limits and Signal Design," *Faculty of Electronics and Telecommunications, UET, VNU, Vietnam*, 11 Nov. 2017
- "An Achievable DoF Region for the Two-User Noncoherent MIMO Broadcast Channel with Statistical CSI," *Technical University of Munich, Germany*, 22 Sept. 2017

Summer Schools

- IEEE ComSoc Summer School on 5G, IoT, and AI technologies Aug. 2020
- IEEE SPS - EURASIP Summer School on Signal Processing for 5G Sweden, May. 2017
- IEEE ITS European School of Information Theory Spain, May. 2017

Events

- 2nd Global Young Vietnamese Scholars Forum, Vietnam Nov. 2019
- 7th Heidelberg Laureate Forum, Germany, Get interviewed in the **10-out-of-200** list of participants Sept. 2019
- Young Engineers and Scientists Tokyo Meeting, Tokyo, Japan, Nov. 2014
- Volunteer for conferences: IEEE ICC 2017, IEEE ISIT 2019

Skills

Computer and Programming

- MATLAB/Simulink, C/C++
- GNU Radio framework for Software-Defined Radio
- \LaTeX , Microsoft Office

Mathematics

- Linear Algebra, Probability and Statistics, Real and Complex Analysis, Optimization

Languages

Vietnamese: Native

English: Fluent

French: Elementary (A2)

Selected Honors, Awards, and Scholarships

- Romberg Grant for selected participants of the 7th Heidelberg Laureate Forum, Germany Sept. 2019
- Graduate with first-class honors (Master level), CentraleSupélec 2016
- Université Paris-Saclay scholarship, University of Paris-Saclay 2015–2016
- Graduate with first-class honors (Bachelor level), UET, VNU 2014
- Excellent Undergraduate Thesis Award, UET, VNU 2014
- Third Prize, Undergraduate Scientific Research Contest, UET, VNU April 2014
- Honda Young Engineers and Scientists Award, Honda Foundation, Japan Nov. 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, 2012
- Shinryo scholarship, Shinryo-en Organization, Japan 2010–2014 (annually)
- Vallet scholarship, Rencontres du Vietnam 2011

Extra-curricular

- Vice-president of Student Association of UET, VNU, April 2012–June 2015
- President of Student Club on Presentation of UET, VNU, April 2011–June 2012
- JENESYS 2.0 culture exchange program, Japan, July 2014
- Vietnam - China Youth Festival, Guangxi, China, Nov. 2013

Hobbies

Music, reading book (favorite author: Haruki Murakami), football, running

References

1. **Prof. Sheng Yang** (Master and Doctoral Advisor)
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2. **Dr. Maxime Guillaud** (Doctoral Advisor)
Mathematical and Algorithmic Sciences Laboratory, Paris Research Center, Huawei Technologies France
📍 Bât. A, 20 quai du Point du Jour, 92100 Boulogne Billancourt, France ✉ maxime.guillaud@huawei.com
3. **Prof. Mari Kobayashi** (Master Advisor)
Institute for Communication Engineering, Technical University of Munich (TUM)
📍 Building N4, Theresienstrasse 90, 80333 Munich, Germany ✉ mari.kobayashi@tum.de ☎ +49 89 289 23086
4. **Assoc. Prof. Nguyen Linh Trung** (Bachelor Advisor)
Faculty of Electronics and Telecommunications, UET, VNU
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