Expert/Consultant Curriculum Vitae

Professor Zhi Ding

Ph.D. and Fellow of IEEE

Expertise

- Wireless Communication Systems
- Cellular Wireless (2G, 3G, 4G, 5G)
- Communication Network Protocols
- Multi-Antenna Technologies
- WLAN (WiFi, Bluetooth)
- xDSL Internet Services
- DOCSIS Modems
- Optical Networks

Professional Summary

- Professor of major US universities for over 32 years.
- *Consulted for multiple major technology companies*
- Worked as expert on multiple patent
- infringement cases.
- Conducted research works on Communications and Signal Processing for over 30 years.
- Supervised over 30 PhD students.
- Author of more than 200 journal papers and 2 books on communication technologies.

Dr. Zhi Ding has been a professor of electrical engineering at major US universities for 32 years. Since 1995, he has consulted for both engineering companies such as Nortel, Analog Devices, Intel, and worked as expert for major law firms from US, UK, China, and Canada including Kirkland & Ellis, WilmerHale, Quinn Emanuel, Fish & Richardson, Sheppard Mullin, Sidley Austin, Mayer Brown, Venable, and Finnegan, on multiple technical and patent infringement cases. He has been conducting research works on wireless communications and signal processing since 1984. He has supervised over 30 PhD students. He is an author of 200 journal papers and 2 technical books on communication technologies. He has taught classes that cover the fundamentals of signal detection, communications, and systems.

Dr. Ding currently holds the position of Distinguished Professor at the University of California, where he was also the Child Family Professor of Engineering and Entrepreneurship in 2009-2014. He served as the steering committee chair of the IEEE Transactions on Wireless Communications. He was elevated to Fellow of IEEE in 2002 by the IEEE Signal Processing Society. He also served as the Technical Program Chair of the IEEE Globecom 2006 (the flagship conference of the IEEE Communications Society), Dr. Ding is an eminent scholar and expert of wireless technologies AND signal processing. He received the IEEE Communications Society's 2012 TC Recognition Award and the 2020 Education Award.

KONINKLIJKE KPN N.V.
EXHIBIT 2002

Intellectual Property Dispute Consulting:

Past Client	Past Engagement
Kirkland & Ellis LLP	2007 (Intel v. WiLAN)
	2008 (Cisco, Motorola, etc., v. R.),
	2008 (Apple v. N.)
	2009 (Cisco v. WiAV)
	2009 (Apple v. P.)
	2009 (Cisco v. M.)
	2010 (Netgear v. R.)
	2011 (Intel v. E.)
	2011 (Cisco v. M.)
	2011 (Cisco, Motorola v. I.)
	2011 (Netgear v. E.)
	2013 (Alcatel Lucent matter)
	2015 (Intel "project Impala")
	2020 (Xiaomi global)
	2021 (Samsung v. E.)
Wilmer Cutler Pickering Hale, & Dorr, LLP	2009 (Apple v. N.)
	2011 (Apple v. S.)
	2013 (Apple v. A.)
	2015 (Apple v. E.)
	2018 (Unified matter)
	2019 (Apple v. O.)
Fish and Richardson, LLP	2014 (Marvell v. I.)
	2018 (NEC v. X.)
	2020 (DISH v. T.)
	2020 (Huawei SEP)
	2020 (Samsung v. E.)
	2021 (LG Electronics, Dell v. N.)
	2021 (Quectel v. P.)
	2021 (Apple v. E.)
	2022 (Apple v. S.)
	2022 (Fish v. C.)
Kaye Scholer LLP	2012 (Timer Warner+Ceres+Atlanta Broadband Finance v. K.)
Bridges and Mavrakakis, LLP	2011(Apple matter)
	2014 (Apple v. C.)
	2015 (Marvell "IP evaluation matter")
Sterne, Kessler, Goldstein & Fox, LLC	2014 (Marvell, MediaTek v. B.)
	2019 (Volkswagen v. C.)
	2020 (Apple v. S.)
Bramson, Plutzik, Mahler & Birkhaeuser	2013 (Karim v. H.)

Gibson, Dunn & Crutcher, LLP	2014 (AT&T v. I)
Quinn Emanuel	2014 (Canon v. I.)
Norton Rose Fulbright US LLP	*2015 (Qualcomm v. B.)*
	2018 (Qualcomm v. A.)
	2021 (NXP v. Me.)
	2023 (NXP v MI.)
Sheppard, Mullin, Richter, and Hampton, LLP	*2015 (TLC v. E.)*
	2017 (ZTE v. H.)
	2018 (HTC v. I.)
	2019 (Motorola v. U.)
	2019 (U-Blox AG v. I.)
	2019 (Continental v. A.)
	2019 (Toyota matter)
	2020 (Oppo v. S.)
	2021 (HTC v. S.)
Duane Morris	*2015 (Comcast, Cox, Time Warner, Verizon v. T.)*
Rothwell, Figg, Ernest, & Manbeck, P.C.	*2016 (LG Electronics v. O.)*
Mayer Brown LLP	*2016 (LG Electronics v. N.)*
Sidley Austin, LLP	*2016 (Huawei v. S.)*
	2018 (Huawei v. O.)
Irell & Manella, LLP	*2016 (Juniper v. M.)*
	2021 (NXP v. M.)
Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P	*2017 (LGE v. BLU)*
	2017 (Sol IP)
Arnold, Porter, Kaye, and Scholer	*2017 (Charter v. S.)*
	2021 (Samsung v. X.)
Venable, LLP	*2017 (Verizon v. S.)*
Pillsbury LLP	*2017 (ZTE v. H.)*
Alston, Bird, LLP	2018 (ASUSTeK v. H.)
Gibson, Dunn & Crutcher, LLP	*2019 (AT&T v. S.)*
Jincheng Tongda & Neal (China)	*2018 (TCL matter)*
Desmaris, LLP	*2019 (Cisco matter)*
Allen & Overy, LLP, UK	*2019 (Huawei v. C.)*
Gowling WLG, Canada	2019 (IP matter)
Erise IP	2019 (Apple v. I.) 2022 (Apple v. L.)
Questel (China)	2020 (ZTE matter)
Xiaomi (China)	2020 (Siemens)
Munger Tolles & Olson, LLP (Tesla)	2021 (Tesla v. O.)
Orrick, Herrington, & Sutcliffe, LLP	2021 (Canon v. W.)
OPPO	2020 (OPPO matters) 2021 (OPPO matters)
Saikrishna & Associates (India)	2019 (Xiaomi v. E.)
	2021 (Firm matter)

	2022 (vivo v. N.)
Continental	2022 (Continental v. N.)
K&L Gates	2022 (Entropic matter)
Kelley Dryer	2022 (Keep Truckin v. F.)
Collision Communications	2022 (Collision matter)
Haynes Boone	2022 (Apple v. T.)
Vivo	2022 (vivo litigation matters)
Quinsumbing Torres (Philippines)	2022 (vivo v. N.)
Biro Oktroi Roosseno (Indonesia)	2022 (vivo v. N.)
Paul Hastings	2022 (Samsung v. G.)
Unified Patent Inc.	2022 (Unified matter)

Expert Testifying and Depositions (13 Trials and 18 Depositions)

Clients	**Deposition/Testifying Experience**
Bramson, Plutzik, Mahler & Birkhaeuser LLP	2013: ***Deposition*** on Case No. CV 12-05240 PJH Nad Karim v. Hewlett Packard, Co. UNITED STATES NORTHERN DISTRICT COURT OF CALIFORNIA. Settlement ordered Jan. 18, 2017.
Fish and Richardson	2015 (Feb): ***Deposition*** for Marvell. US PTAB *Inter Partes* Review IPR2014-00548 Marvell Semiconductor, Inc. v. Intellectual Ventures I LLC
	2015 (August): ***Deposition*** for Marvell. US PTAB *Inter Partes* Review IPR2014-00548 Marvell Semiconductor, Inc. v. Intellectual Ventures I LLC
Norton, Rose, Fulbright, US, LLP	2016 (April): ***Deposition*** for Qualcomm. US PTAB *Inter Partes* Review cases *IPR2015-10577, IPR2015-10580, IPR2015-10581 Qualcomm Inc. v Bandspeed Inc.*
Sheppard, Mullin, Richter, and Hampton, LLP	*2016 (May):* ***Deposition*** *for in TCL Communication Technology Holdings, LTD., et al. v. Ericsson, et al., Case No. 8:14-cv-341 (C. D. CA).*
	2017 (Feb): ***Testified at C.D. California*** *bench trial.*
Sidley Austin, LLP	*2016 (December):* ***Testified at*** *trial involving Huawei Technologies, Co. Ltd v. Samsung regarding FRAND licensing disputes in Shenzhen Court, P.R. China.*
	2018 (June): ***Deposition*** *for N.D. CA on IP matter concerning Huawei Technologies, Co. Ltd v. Samsung.*
	2018 (December): ***Testified at*** *trial involving Huawei Technologies, Co. Ltd v. Samsung regarding FRAND licensing disputes in Beijing Court of Intellectual Properties, P.R. China.*
Mayer Brown LLP	*2017 (January):* ***Testified during tribunal proceeding*** *for LG Electronics, Inc. in standard essential patent (SEP) licensing dispute* of Nokia Technologies, Ltd. *v.* LG Electronics, Inc. During arbitration hearing in Paris, France.

Venable LLP	2017 (October): ***Deposition*** as expert witness for Verizon Services Corp. in Case No. 2:16-CV-588-WCB (E. D. TX) on US Patent disputes.
Pillsbury LLP	2018 (Feb): ***Deposition*** (E. D. Texas Case No. 5:16-cv-00179-RWS)
	2018 (June): **Testified at E. D. Texas** (Texarkana) jury trial (Case No. 5:16-cv-00179-RWS).
Allen & Overy LLP UK	*2019 (April)* ***Testified at*** *trial involving Huawei Technologies, Co. Ltd v. Conversant regarding FRAND licensing disputes in Nanjing Intermediate Court, P.R. China.*
Sidley Austin LLP, US	*2019 (Sept.)* ***Testified at*** *trial involving Huawei Technologies, Co. Ltd v. PanOptics, regarding FRAND licensing disputes in Shenzhen Intermediate Court, P.R. China.*
Sheppard, Mullin, Richter, and Hampton, LLP	*2019 (Dec. 3rd):* ***Deposition*** *for HTC and Apple in HTC Corporation, HTC America, Inc., and Apple Inc. v. INVT SPE LLC, Case Nos. IPR2018-01555 and IPR2018-01581.*
Sterne, Kessler, Goldstein & Fox, LLC	*2020 (Feb.):* ***Deposition*** *for Volkswagen Group of America, In. v. Carucel Investments, L.P. Case Nos. IPR2019-01573 and IPR2019-01101.*
Jincheng Tongda & Neal, LLP	*2021 (June)* ***Testified at*** *trial involving TCL. v. Ericsoon, regarding FRAND licensing disputes in Shenzhen Intermediate Court, P.R. China.*
Orrick, Herrington, & Sutcliffe, LLP	*2021 (October):* ***Deposition*** *for Canon, Inc, in Canon, v. WSOU Investments, LLC d/b/a/ Brazos Licensing, W.D. Texas, Case No. 6:20-cv-980.*
Fish & Richardson, P.C.	*2021 (November) 1st* ***Deposition*** *for Petitioner IPR 2021-00560 in Quectel v. Koninklijke Philips N.V.*
	2021 (December) 1st ***Deposition*** *for Petitioner on IPR 2021-00563 Proceeding in Quectel v. Koninklijke Philips N.V.*
	2022 (March 31) 2nd ***Deposition*** *for for Petitioner IPR 2021-00560 in Quectel v. Koninklijke Philips N.V. (028) (-)*
	2022 (April 1) 2nd ***Deposition*** *for Petitioner on IPR 2021-00563 Proceeding in Quectel v. Koninklijke Philips N.V. (+)*
	2022 (Oct. 28) ***Deposition*** *for Petitioner on IPR 2022-00339 in Apple v. Ericsson.*
Jauar Jahja and Partners (Indonesia)	*2022 (April 25)* ***Testified*** *at trial involving OPPO v. Nokia regarding one patent disputes at Court in Jakarta, Indonesia.* ***Successful denial of temporary injunction.*** *2022 (April 26)* ***Testified*** *at trial involving OPPO v. Nokia regarding another patent dispute at Court in Jakarta, Indonesia.* ***Successful denial of temporary injunction.***
Quinsambing & Torres (Philippines)	*2022 (September)* ***Testified*** *on site at trial involving vivo v. Nokia regarding patent disputes in Regional Trial Court in Manila, the Philippines.* ***Successful denial of temporary injunction.***

Orrick, Herrington, & Sutcliffe, LLP	*2021 (Oct. 12)* ***Deposition*** *Western D. of Texas cas: 6:20-cv-00980-ADA (Canon)*
Arnold, Porter, Kaye, and Scholer	*2022 (Dec. 30)* ***Deposition*** *on IPR 2022-00613 Proceeding (Samsung)*
Biro Oktroi Roosseno (Indonesia)	*2023 (Jan. 4)* ***Testified*** *online at trial involving vivo v. Nokia regarding patent disputes at Court in Jakarta, Indonesia.* ***Successful denial of temporary injunction.*** *2023 (Feb. 1)* ***Testified*** *on site at trial involving vivo v. Nokia regarding patent disputes at Court in Jakarta, Indonesia.* ***Successful denial of temporary injunction.***

Recent IPR Declarations	**32 Expert Opinions**
	IPR2014-00548 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2014-12-03), with link to Final PTAB Decision, canceling all but 2 claims (2015-11-30). IPR2015-00314 Expert Declaration to the Patent Trial and Appeal Board, Instituted, with link to Final PTAB Decision finding 10 claims (all but 3 claims) unpatentable (2016-09-07). IPR2015-00315 Expert Declaration and Supplemental Expert Declaration to the Patent Trial and Appeal Board, Instituted (2015-11-16), link to final PTAB Trial Decision. Unpatentable (2016-09-07). IPR2015-01580 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2015-11-16), with link to final PTAB Trial Decision. Unpatentable (2016-09-07). IPR2015-00531 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2015-6-11), link to Final PTAB decision finding all but 3 dependent claims unpatentable (2017-08-23). IPR2015-01582 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2015-11-16), link to PTAB Decision on Institution of IPR and Grant of Motion for Joinder with ITR2015-00531. IPR2016-00620 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2016-08-24), link to Final PTAB decision finding all but 2 dependent claims invalid (2017-08-23).

	IPR2016-00623 Expert Declaration to the Patent Trial and Appeal Board, Instituted (2016-08-24), with link to PTAB decision (2017-08-23). IPR2018-01555 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2019-03-07); Decision (2020-2-28) IPR2018-01581 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2019-04-01); Decision (2020-2-28) IPR2019-01573 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2020-01-22); Final Decision: Unpatentable (2020-11-20) IPR2019-01105 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2019-12-02); Final Decision: Unpatentable (2020-11-20) IPR2019-01101 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2019-12-02); Final Decision: Unpatentable (2020-11-20) IPR2021-00560 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2021-09-13); Final Decision: (2022-09-09) IPR2021-00563 Expert Declaration to the Patent Trial and Appeal Board. Instituted (2021-09-15); Final Decision: Unpatentable (2022-9-13) IPR2021-00587 Expert Declaration to the Patent Trial and Appeal Board. Filed (2021-02-26); Withdrawn. *IPR2021-00683* Expert Declaration to the Patent Trial and Appeal Board. Filed (2021-03-19); Withdrawn. IPR2021-01468 Expert Declaration to the Patent Trial and Appeal Board. Filed (2021-09-01). *IPR2022-00339* Expert Declaration to the Patent Trial and Appeal Board. Instituted (2022-08-22); Settlement (2022-12-20). IPR2022-00348 Expert Declaration to the Patent Trial and Appeal Board, Filed (2022-02-15).

	IPR2022-00349 Expert Declaration to the Patent Trial and Appeal Board, Filed (2022-02-15), Settled. IPR2022-00616 Expert Declaration to the Patent Trial and Appeal Board, Filed (2022-02-18), Withdrawn. IPR2022-00619 Expert Declaration to the Patent Trial and Appeal Board, Filed (2022-02-25), *IPR2022-00613* Expert Declaration to the Patent Trial and Appeal Board. Instituted (2022-10-20) *IPR2022-01512* Expert Declaration to the Patent Trial and Appeal Board. Filed (2022-09-09) *IPR2022-01598* Expert Declaration to the Patent Trial and Appeal Board. Filed (2022-10-04) *IPR2023-00151* Expert Declaration to the Patent Trial and Appeal Board. Filed (2022-11-30) *IPR2023-00171* Expert Declaration to the Patent Trial and Appeal Board. Filed (2022-11-08) *IPR2023-00441* *Expert Declaration* to the Patent Trial and Appeal Board. Filed (2023-01-05) IPR2023-00496 *Expert Declaration* to the Patent Trial and Appeal Board, Filed (2023-01-20). *IPR2023-00644* *Expert Declaration* to the Patent Trial and Appeal Board, Filed (2023-03-07). *IPR2023-00720* *Expert Declaration* to the Patent Trial and Appeal Board, Filed (2023-03-16). *IPR2023-00721* *Expert Declaration* to the Patent Trial and Appeal Board, , Filed (2023-03-16).

Employment History

From:	2000	**University of California at Davis**
To:	Present	Davis, CA
	Position:	*Professor* (2000-2020) and *Distinguished Professor* (2020-), *Department of Electrical and Computer Engineering*

From: 01/1999 **University of Iowa**
To: 09/2000 Iowa City, IA
Position: *Assoc. Professor, Department of Electrical and Computer Engineering*

From: 01/1997 **Hong Kong University of Science and Technology**
To: 12/1997 Hong Kong
Position: *Visiting Associate Professor, Department of Electrical and Electronic Engineering*

From: 09/1995 **Auburn University**
To: 12/1998 Auburn, AL
Position: *09/1995-12/1998: Associate Professor, Department of Electrical and Computer Engineering*
09/1990-08/1995: Assistant Professor, Department of Electrical and Computer Engineering

From: 08/1993 **Australian National University**
To: 09/1993 Canberra, Australia
Position: *Visiting Research Fellow, Faculty of Information Technology and Engineering*

From: 06/1993 **US Air Force Wright Laboratory**
To: 08/1993 Eglin AFB, Florida
Position: *Faculty Research Associate, Armament Directorate*

From: 06/1992 **NASA Lewis Research Center**
To: 08/1992 Cleveland, OH
Position: *Visiting Faculty Research Fellow*

From: 08/1987 **Cornell University**
To: 08/1990 Ithaca, NY
Position: *Research Assistant*

From: 09/1984 **University of Toroto**
To: 08/1987 Toronto, Ontario, Canada
Position: *Research Assistant*

Technical Consulting

Consulted for multiple major technology companies, aside from IP litigation related matters.

Patents (Granted and/or Licensed)

Patent Number	Date Issued	Title
US 6,396,885	Mar.28, 2002	Co-channel interference reduction in wireless communications systems (Nortel)
US 6,463,099	Oct.8, 2002	Blind channel equalizers and methods of blind channel equalization (Licensed)
US 7,379,513	Mar. 20, 2008	Channel estimation in CDMA communications systems using both lower power pilot channel and higher power date channel
US 10,623,230	Apr. 14, 2020	Trans-layer robust header-compression technique

Education

1990	Cornell University, Ithaca, NY	Ph.D., Electrical Engineering
1987	University of Toronto, Toronto, Canada	MS, Electrical Engineering
1982	Nanjing Institute of Technology, Nanjing, China	BS, Wireless Engineering

Publications

Books & Book Chapters

[1] B. P. Lathi and Z. Ding, *Modern Digital and Analog Communication Systems,* 5th edition, Oxford University Press, 2018.

[2] Zhi Ding and Ye Li, *Blind Equalization and Identification*, Marcel Dekker, New York, 2001.

[3] Z. Ding, "Chapter 7: Linear Predictive Algorithms for Blind Multichannel Identification," in *Signal Processing Advances in Wireless and Mobile Communications*, Vol. I: Trends in Channel Estimation and Equalization, G. B. Giannakis, Y. Hua, P. Stoica, and L. Tong (Editors), Prentice Hall, 2000.

[4] Z. Ding, "Blind Channel Identification and Equalization using Spectral Correlation Measurements: Frequency Domain Analysis," in *Cyclostationarity in Communications and Signal Processing*, William A. Gardner, Ed., pp.417-436, IEEE Press, 1993.

[5] Z. Ding, C. R. Johnson, Jr., and R. A. Kennedy, "Chapter 3: Global Convergence Issues with Linear Blind Adaptive Equalizers," in *Blind Deconvolution*, Simon Haykin, Ed., pp.60-120, Prentice-Hall, 1994.

[6] Z. Ding, "Adaptive Filters for Blind Equalization," in *IEEE DSP Handbook*, Douglas B. Williams, Ed., pp.24.1-24.17, IEEE Press, 1998.

Journal Papers

[1] M. Del Rosario and Z. Ding, ``Learning-Based MIMO Channel Estimation under Practical Pilot Sparsity and Feedback Compression," in IEEE Transactions on Wireless Communications, 2022, doi: 10.1109/TWC.2022.3202750.

[2] C. Sun, X. Gao and Z. Ding, ``Optimization of Workload Balancing and Power Allocation for Wireless Distributed Computing," in IEEE Transactions on Wireless Communications, vol. 21, no. 9, pp. 7682-7695, Sept. 2022, doi: 10.1109/TWC.2022.3160493.

[3] C. -H. Hsu, C. Feres and Z. Ding, ``Wirtinger Flow for Nonconvex Blind Demixing with Optimal Step Size," in IEEE Wireless Communications Letters, 2022, doi: 10.1109/LWC.2022.3203313.

[4] Zhang, S., Deng, Q. & Ding, Z., ``Multilayer graph spectral analysis for hyperspectral images," EURASIP Journal of Adv. Signal Process, 2022, 92 (2022). doi: https://doi.org/10.1186/s13634-022-00926-8;

[5] C. Feres and Z. Ding, ``An Unsupervised Learning Paradigm for User Scheduling in Large Scale Multi-Antenna Systems," in IEEE Transactions on Wireless Communications, 2022, doi: 10.1109/TWC.2022.3215471.

[6] L. D. Chamain, S. Qi, and Z. Ding, ``End-to-End Image Classification and COmpression with variational autoencoder" IEEE Internet of Things Journal, vol. 70, 2022, doi: 10.1109/JIOT.2022.3182313.

[7] C. Feres and Z. Ding, ``A Riemannian Geometric Approach to Blind Signal Recovery for Grant-Free Radio Network Access," IEEE Transactions on Signal Processing, vol. 70, pp. 1734-1748, 2022, doi: 10.1109/TSP.2022.3159988.

[8] Q. Deng, S. Zhang and Z. Ding, ``An Efficient Hypergraph Approach to Robust Point Cloud Resampling," IEEE Transactions on Image Processing, vol. 31, pp. 1924-1937, 2022, doi: 10.1109/TIP.2022.3149225.

[9] X. Ling, B. Zhang, H. Xie, J. Wang, Z. Ding, Hash Access in Blockchain Radio Access Networks: Characterization and Optimization IEEE Internet of Things Journal, 9(11): 8053-8066, 1 June 2022 doi: 10.1109/JIOT.2021.3111915.

[10] Qi, S.; He, M.; Bai, Z.; Ding, Z.; Sandhu, P.; Zhou, Y.; Namadi, P.; Tom, B.; Hoang, R.; Anderson, J. ``Multi-Location Emulation of a Process-Based Salinity MOdel Using Machine Learning',' Water , 14(13):2030, 2022, doi: 10.3390/w14132030.

[11] C. Wang, A. -A. Lu, X. Gao and Z. Ding, ``Robust Precoding for 3D Massive MIMO Configuration With Matrix Manifold Optimization," IEEE Transactions on Wireless Communications, vol. 21, no. 5, pp. 3423-3437, May 2022, doi: 10.1109/TWC.2021.3121734.

[12] Z. Liu, M. Del Rosario, and Z. Ding, ``A Markovian Model-Driven Deep Learning Framework for Massive MIMO CSI Feedback," in IEEE Transactions on Wireless Communications,, vol. 21, no. 2, pp. 1214-1228, Feb. 2022, doi: 10.1109/TWC.2021.3103120.

[13] L. Teng, G. Zhai, Y. Wu, X. Min, W. Zhang, Z. Ding, and C Xiao, ``QoE Driven VR 360Â° Video Massive MIMO Transmission," IEEE Transactions on Wireless Communications, vol. 21, no. 1, pp. 18-33, Jan. 2022, doi: 10.1109/TWC.2021.3093305.

[14] Q. Deng, S. Zhang and Z. Ding, ``Point Cloud Resampling via Hypergraph Signal Processing," IEEE Signal Processing Letters, vol. 28, pp. 2117-2121, 2021, doi: 10.1109/LSP.2021.3119257.

[15] X. Ling, P. Chen, J. Wang and Z. Ding, ``Data Broker: Dynamic Multi-Hop Routing Protocol in Blockchain Radio Access Network," in IEEE Communications Letters, vol. 25, no. 12, pp. 4000-4004, Dec. 2021, doi: 10.1109/LCOMM.2021.3114218.

[16] Qi, Siyu, Zhaojun Bai, Zhi Ding, Nimal Jayasundara, Minxue He, Prabhjot Sandhu, Sanjaya Seneviratne, and Tariq Kadir, ``Enhanced Artificial Neural Networks for Salinity Estimation and Forecasting in the Sacramento-San Joaquin Delta of California." Journal of Water Resources Planning and Management 147, no. 10 (2021): 04021069.

[17] Y. -C. Lin, Z. Liu, T. -S. Lee and Z. Ding, ``Deep Learning Phase Compression for MIMO CSI Feedback by Exploiting FDD Channel Reciprocity," in IEEE Wireless Communications Letters, vol. 10, no. 10, pp. 2200-2204, Oct. 2021, doi: 10.1109/LWC.2021.3096808.

[18] C. J. Feres and Z. Ding, ``Wirtinger Flow Meets Constant Modulus Algorithm: Revisiting Signal Recovery for Grant-Free Access," in IEEE Transactions on Signal Processing, vol 69, pp. 6515-6529, Aug. 2021. doi: 10.1109/TSP.2021.3103038.

[19] Q. Hu, Y. Liu, Y. Cai, G. Yu and Z. Ding, ``Joint Deep Reinforcement Learning and Unfolding: Beam Selection and Precoding for mmWave Multiuser MIMO With Lens Arrays," in IEEE Journal on Selected Areas in Communications, vol. 39, no. 8, pp. 2289-2304, Aug. 2021, doi: 10.1109/JSAC.2021.3087233.

[20] C. Sun, J. Wang, X. Gao, Z. Ding and X. Zheng, ``Fiber-Enabled Optical Wireless Communications With Full Beam Coverage," in IEEE Transactions on Communications, vol. 69, no. 5, pp. 3207-3221, May 2021, doi: 10.1109/TCOMM.2021.3059458.

[21] Y. Ge, Q. Deng, P.C. Ching, Z. Ding ``OTFS Signaling for Uplink NOMA of Heterogeneous Mobility Users," in IEEE Transactions on Communications, 2021, doi: 10.1109/TCOMM.2021.3059456.

[22] Y. Ge, Q. Deng, P.C. Ching, Z. Ding ``Receiver design for OTFS with fractionally spaced sampling approach", in IEEE Transactions on Wireless Communications, 2021, doi: 10.1109/TWC.2021.3055585.

[23] S. Zhang, S. Cui and Z. Ding, ``Hypergraph Spectral Analysis and Processing in 3D Point Cloud," in IEEE Transactions on Image Processing, vol. 30, pp. 1193-1206, 2021, doi: 10.1109/TIP.2020.3042088.

[24] S. Zhang, S. Cui and Z. Ding, ``Hypergraph Spectral Clustering for Point Cloud Segmentation," in IEEE Signal Processing Letters, vol. 27, pp. 1655-1659, 2020, doi: 10.1109/LSP.2020.3023587.

[25] X. Ling, Y. Le, J. Wang and Z. Ding, ``Hash Access: Trustworthy Grant-Free IoT Access Enabled by Blockchain Radio Access Networks," in IEEE Network, vol. 34, no. 1, pp. 54-61, January/February 2020, doi: 10.1109/MNET.001.1900159.

[26] Ling, X.; Gao, Z.; Le, Y.; You, L.; Wang, J.; Ding, Z.; Gao, X. ``Satellite-Aided Consensus Protocol for Scalable Blockchains", Sensors Vol. 20, Issue 19, 2020.

[27] Z. Jiang, X. Shen, H. Wang and Z. Ding, ``Joint PSK Data Detection and Channel Estimation Under Frequency Selective Sparse Multipath Channels," in IEEE Transactions on Communications, vol. 68, no. 5, pp. 2726-2739, May 2020, doi: 10.1109/TCOMM.2020.2975172.

[28] Z. Liu, L. Zhang and Z. Ding, ``An Efficient Deep Learning Framework for Low Rate Massive MIMO CSI Reporting," in IEEE Transactions on Communications, vol. 68, no. 8, pp. 4761-4772, Aug. 2020, doi: 10.1109/TCOMM.2020.2993626.

[29] Q. Chen and Z. Ding, ``Accommodating LAA Within IEEE 802.11ax WiFi Networks for Enhanced Coexistence," in IEEE Transactions on Wireless Communications, vol. 19, no. 11, pp. 7621-7636, Nov. 2020, doi: 10.1109/TWC.2020.3014425.

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Professional Services and Achievements

- Steering Committee Chairman, *IEEE Transactions on Wireless Communications,* 1.2008-1-2010
- Canadian National Science and Engineering Research Council Panelist, 2009-2012
- Fellow of IEEE
- Steering Committee Member, *IEEE Transactions on Wireless Communications,* 1.2006-1-2008
- General Chair, IEEE 2016 International Conference on Acoustics, Speech, and Signal Processing, Shanghai, China.
- Technical Program Chair, *IEEE 2006 Globecom*, San Francisco, CA.
- Editorial Board Member, *IEEE Signal Processing Magazine*, 1/2003-1/2007.
- Associate Editor, *IEEE Signal Processing Letters*, 1.2002-1.2005.
- Associate Editor, IEEE Transactions on Signal Processing, 1.2001-1.2004.
- Editor, Special Issue on Multiuser Detection and Blind Estimation, *EURASIP Journal on Applied Signal Processing*, Dec. 2002.
- Member, IEEE Statistical Signal and Array Processing Technical Committee, 1993-1998.
- Member, IEEE Signal Processing for Communications Technical Committee, 1998-2004.
- Associate Editor, IEEE Transactions on Signal Processing, 1994-1997.
- Technical Program Committee Member, 3rd IEEE Workshop on Signal Processing Advances in Wireless Communications, Taiwan, March 2001.
- Organization Committee Member, 1st IEEE Workshop on Signal Processing Advances in Wireless Communications, Paris, France, April 1997.
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