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# Jishan Wu

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Full Professor | Chemistry

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<b>EDUCATION</b>	<b>Doctor of Philosophy in Chemistry / Max-Planck Institute for Polymer Research</b> , with Professor Klaus Müllen	2004
	<b>Master of Science in Polymer Chemistry / Changchun Institute of Applied Chemistry, CAS</b> , with Professor Xianhong Wang & Professor Fosong Wang	2000
	<b>Bachelor of Science in Chemistry / Wuhan University</b>	1997

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<b>CAREER</b>	<b>Provost's Chair Professor</b>	2024–Now
	Department of Chemistry / National University of Singapore	
	<b>Full Professor</b>	2017–Now
	Department of Chemistry / National University of Singapore	
	<b>Dean's Chair Professor</b>	2014–2017
	Department of Chemistry / National University of Singapore	
	<b>Associate Professor</b>	2012–2014
	Department of Chemistry / National University of Singapore	
	<b>Senior Scientist I/II (joint appointment)</b>	2010–2018
Institute of Materials Research and Engineering, A*STAR		
<b>Assistant Professor</b>	2007–2011	
Department of Chemistry / National University of Singapore		
<b>Research Associate</b>	2005–2007	
Department of Chemistry and Biochemistry / UCLA with Sir Fraser Stoddart		
<b>Project Leader</b>	2004–2005	
Max-Planck Institute for Polymer Research with Professor Klaus Müllen		

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<b>SELECTED AWARDS AND HONORS</b>	<b>Provost's Chair Professorship</b>	2024
	For NUS tenured Professors with international recognition in the field and superior performance to other faculty members at the rank of Professor <b>Andrews Lectureship from the University of New South Wales, Australia</b>	2024
	The lectures began in 1960 to bring eminent lecturers to UNSW to deliver a series of talks.	
	<b>National Research Foundation Investigatorship</b>	2019
	For outstanding mid-career investigators with 2.8 million S\$ grant for 5 years	
	<b>Outstanding Scientist Award</b>	
	For outstanding researchers in NUS Faculty of Science	
	<b>Lead PI of an MOE Tier 3 programme</b>	2015
	A highly competitive research programme from the Ministry of Education of Singapore, with 10 million S\$ grant for 5 years	
	<b>Outstanding Scientist Award</b>	2015
For outstanding researchers in NUS Faculty of Science		
<b>BASF-Singapore National Institute of Chemistry Award in Materials Science</b>	2012	
An industry-sponsored award for outstanding researchers in Singapore		
<b>NUS Young Researcher Award</b>	2012	
For outstanding young researchers in the National University of Singapore		
<b>Singapore Young Scientist Award</b>	2011	
Singapore presidential award for outstanding young scientists in Singapore		

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<b>RESEARCH INTEREST</b>	<p><math>\pi</math>-Conjugated macrocycles and molecular cages</p> <p>Topological molecular carbons</p> <p>2D and 3D aromaticity</p> <p>Synesthetic organic spin chemistry</p> <p>Magnetism and magnetic materials</p> <p>Organic near infrared dyes and bioimaging</p> <p>Organic electronics, photonics, spintronics and quantum information processing</p>
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<b>MAJOR RESEARCH GRANTS</b>	<p><b>A*STAR MTC IRG grant</b> 2023–2026</p> <p>Twisted carbon nanobelts with persistent chiroptical properties for photonics and electronics (TPV: 841,000 S\$)</p> <p><b>MOE Tier 2 grant</b> 2023–2026</p> <p>Toward 3D global aromaticity rules (TPV: 480,519S\$)</p> <p><b>A*STAR AME grant</b> 2020–2023</p> <p>Solution-processed nanographene based distributed feedback lasers (TPV: 674,000 S\$)</p> <p><b>MOE Tier 2 grant</b> 2019–2022</p> <p>Metal organic radical frameworks (TPV: 700,000 S\$)</p> <p><b>MOE Tier 2 grant</b> 2019–2022</p> <p>Bottom-up synthesis of post-graphene organic Dirac materials (TPV: 900,000 S\$)</p> <p><b>NRF Investigatorship</b> 2019–2024</p> <p>Toward carbon-base magnets (TPV: 2.8 million S\$)</p> <p><b>AMAT-NUS Corp Lab</b> 2018–2023</p> <p>Atomic layer deposition of carbons (TPV: 498,000 S\$)</p> <p><b>MOE Tier 3 programme</b> 2015–2020</p> <p>Open-shell polycyclic hydrocarbons for electronics, photonics and spintronics (TPV: 10 million S\$)</p> <p><b>MOE Tier 2 grant</b> 2014–2017</p> <p>Stable <math>\pi</math>-radicals as new charge and spin transporting materials (TPV: 782,000 S\$)</p> <p><b>MOE Tier 2 grant</b> 2012–2015</p> <p>Porphyrin-based NIR dyes for high-efficient solar cells (TPV: 490,000 S\$)</p> <p><b>A*STAR BMRC-NMRC joint program</b> 2011–2014</p> <p>Stable near infrared dye based fluorescent probe-library for biolabelling, biosensing and bioimaging (TPV: 532,000 S\$)</p> <p><b>Defence Science and Technology Agency, DIRP</b> 2009–2011</p> <p>Soluble and stable laser absorbing dyes (TPV: 556,000 S\$)</p> <p><b>A*STAR SERC TSRP</b> 2009–2012</p> <p>Graphene-based composites and thin-films for electrical applications (TPV: 764,000 S\$)</p> <p><b>NUS Young Investigator Award</b> 2008–2011</p> <p>Nano-sized graphene, graphyne and graphdiyne as potential materials for electronics (TPV: 500,000 S\$)</p>
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<b>SUMMARY OF OUTPUTS</b>	1 monograph (" <a href="#">Diradicaloids</a> ") and 365+ articles including <i>Nat. Chem.</i> (×3)   <i>Chem</i> (×8)   <i>Nat. Synth.</i> (×3)   <i>Nat. Commun.</i> (×6)   <i>Sci. Adv.</i> (×3)   <i>J. Am. Chem. Soc.</i> (×43)   <i>Angew. Chem. Int. Ed.</i> (×49)   <i>Adv. Mater.</i> (×7)   <i>Chem. Soc. Rev.</i> (×3)   <i>Acc. Chem. Res.</i> (×2)	
<b>SUPERVISION</b>	Current group: 9 PDFs / 15 PhD Students Alumni: 27 PDFs, 26 PhD Students, 3 MSc Students, 19 Undergraduate Students; 27 Alumni have become Professors/Lecturers in academia	
<b>ESTEEM AND ACADEMIC ACTIVITIES</b>	<p><b>Invited Seminars</b> Over 80 Invited/Keynote/Plenary Lectures</p> <p><b>Organization of Scientific Meetings</b> Chair of the 10<sup>th</sup> Singapore International Chemistry Conference Organizers/Co-organizers of symposia at ICPP series and ICMAT series several times</p> <p><b>Editor and Editorial Board Members</b> Advisory board member of <i>Chem</i> (Cell Press, IF: 22.804; 2020-) Associate Editor of <i>Materials Today Chemistry</i> (Elsevier, IF: 8.301; 2021-2022) Advisory board member of <i>JACS</i> (ACS, IF: 15.0, 2024-)</p>	
<b>TEACHING</b>	<p>Polymer Chemistry I/II</p> <p>Advanced Polymer Science</p> <p>Advanced Organic Synthesis</p> <p>Advanced Organic Materials</p>	<p>UG-L3</p> <p>UG-L4</p> <p>PG</p> <p>PG</p>
<b>SELECTED SERVICE ROLES (at NUS)</b>	<p>University Promotion and Tenure Committee Member</p> <p>Deputy Head (Research) of the Department of Chemistry, NUS</p> <p>Member of the Faculty Promotion and Tenure Committee</p>	<p>2023–</p> <p>2018–2021</p> <p>2017–2021</p>
<b>FULL LIST OF AWARDS, PRIZES AND FELLOWSHIPS</b>	<p>Provost's Chair Professorship</p> <p>Andrews Lectureship from the University of New South Wales, Australia</p> <p>Singapore National Institute of Chemistry (SNIC) Fellow</p> <p>NRF Investigatorship Award</p> <p>Highly Cited Researchers (Cross Field) list from Clarivate Analytics</p> <p>Asian Core Program Lectureship Award from Korea</p> <p>Asian Core Program Lectureship Award from Japan</p> <p>Asian Core Program Lectureship Award from Thailand</p> <p>Asian Core Program Lectureship Award from Taiwan</p> <p>NUS Faculty of Science Outstanding Scientist Award</p> <p>Lead PI of MOE Tier 3 programme</p> <p>Dean's Chair Professorship</p> <p>Outstanding Chemist Award / Department of Chemistry / NUS</p> <p>Distinguished Lectureship Award from the Chemical Society of Japan</p> <p>Asian Core Program Lectureship Award from Hong Kong</p> <p>Invited Lecturer of Asian Excellence from the Japanese Society of Polymer Science</p> <p>BASF-Singapore National Institute of Chemistry Award in Materials Science</p> <p>NUS Young Researcher Award</p> <p>Young Scientist Award, Faculty of Science / NUS</p> <p>Young Chemist Award / Department of Chemistry / NUS</p> <p>Singapore Young Scientist Award</p> <p>Asian Core Program Lectureship Award from Japan</p> <p>NUS Young Investigator Award</p>	<p>2024</p> <p>2024</p> <p>2020</p> <p>2019</p> <p>2018</p> <p>2017</p> <p>2017</p> <p>2016</p> <p>2016</p> <p>2015</p> <p>2015</p> <p>2014</p> <p>2013</p> <p>2013</p> <p>2012</p> <p>2012</p> <p>2012</p> <p>2012</p> <p>2011</p> <p>2011</p> <p>2011</p> <p>2009</p> <p>2008</p>

Year 2024

370. T. Jiao, C.-H. Wu, Y.-S. Zhang, X. Miao, S. Wu, S.-D. Jiang\*, and J. Wu\*, "Unveiling the Mysterious Hydrocarbon – Clar's Goblet", preprint posted on *ChemRxiv*, 2024, DOI: <https://doi.org/10.26434/chemrxiv-2024-ks6xm>; under peer review in *Nat. Chem.*.
369. S. Song, A. P. Solé, A. Matěj, G. Li, O. Stetsovych, D. Soler, H. Yang, M. Telychko, J. Li, M. Kumar, J. Brabec, L. Veis, J. Wu\*, P. Jelinek\*, J. Lu\*, "Highly-Entangled Polyradical Nanographene with Coexisting Strong Correlation and Topological Frustration", *Nat. Chem.* 2024, 16, 938–944 (Highlighted by [ChemistryViews](#)).
368. Y. Zou, L. Jiao, Y. Han, L. Ren, Q. Zhou, J. Wu\*, "Peri-pentacene and Peri-hexacene Diradicaloids", *J. Am. Chem. Soc.* 2024, 146, 27293–27298.
367. L. Ren, Y. Han, L. Jiao, Y. Zou and J. Wu\*, "Highly Strained, Fully  $\pi$ -Conjugated Porphyrin Cyclophanes: Template-free Synthesis and Global Aromaticity", *Angew. Chem. Int. Ed.* 2024, 63, e202418532 (VIP paper).
366. Q. Zhou, W. Yuan, Y. Li, Y. Han, L. Bao, W. Fan, L. Jiao, Y. Zhao, Y. Ni, Y. Zou, H.-B. Yang and J. Wu\*, "[5]Helicene Based  $\pi$ -Conjugated Macrocycles with Persistent Figure-Eight and Möbius Shapes: Facile Synthesis, Chiral Resolution and Bright Circularly Polarized Luminescence", *Angew. Chem. Int. Ed.* 2024, 63, e202417749.
365. W. Jiang, S. Wu, D. Xu, L. Tu, Y. Xie\*, P. Pasqués-Gramage, P. G. Boj, M. A. Díaz-García, F. Li,\* J. Wu\* and Z. Li\*, "Stable Xanthene Radicals and Their Heavy Chalcogen Analogues Showing Tunable Doublet Emission from Green to Near-infrared", *Angew. Chem. Int. Ed.* 2024, 63, e202418762 (VIP paper).
364. G.-F. Huo, W.-T. Xu, J. Hu, Y. Han, W. Fan, W. Wang, Z. Sun,\* H.-B. Yang,\* and J. Wu\*, "Perylene-Embedded Helical Nanographenes with Emission up to 1010 nm: Synthesis, Structures, and Chiroptical Properties", *Angew. Chem. Int. Ed.* 2024, 63, e202416707.
363. L. Wang, W. Niu, D. Tian,\* T. Jiao, L. Zhang, X. Hou, Y. Han, Y. Zou, J. Wu\*, G. Li\*, "Stable Mono-radical and Triplet Diradicals Based on Allylic Radical-Embedded All-benzenoid Polycyclic Hydrocarbons", *Angew. Chem. Int. Ed.* 2024, e202415746.
362. X. Chen, Y. Zhu, Y. Xu, M. Rao, P. Pang, B. Zhang, C. Xu, W. Ni, G. Li\*, J. Wu\*, M. Li\*, Y. Chen, and Y. Geng, "Design of Ultra-Narrow Bandgap Polymer Acceptors for High-Sensitivity Flexible All-Polymer Short-Wavelength Infrared Photodetectors", *Angew. Chem. Int. Ed.* 2024, 63, e202413965.
361. S. Wu, Y. Han, Y. Ni, X. Hou, H. Wei, Z. Li\* and J. Wu\*, "Unveiling Möbius/Hückel Topology and Aromaticity in A Core-Expanded [10]Annulene at Different Oxidation States." *Angew. Chem. Int. Ed.* 2024, 63, e202320144.
360. G. Huo, W.-T. Xu, Y. Han, J. Zhu, X. Hou, W. Fan, Y. Ni, S. Wu, H.-B. Yang,\* and J. Wu\*, "Expanded Azahelicenes with Large Dissymmetry Factors." *Angew. Chem. Int. Ed.* 2024, 63, e202403149 (Highlighted by [ChemistryViews](#)).
359. T. Shen, P. Pasqués-Gramage, J. M. Villalvilla, P. G. Boj, J. A. Quintana, Y. Zou, Y. Han, L. Jiao, L. Ren, M. A. Díaz-García\* and J. Wu\*, "[4]Rhombene: Solution-Phase Synthesis and Application for Distributed Feedback Lasers With Emission Beyond 830 nm." *Angew. Chem. Int. Ed.* 2024, 63, e202410828.
358. L. Ren, Y. Han, X. Hou, Y. Zou, T. Jiao, and J. Wu\*, "Cyclooctatetrathiophene Annulated Multicyclic Macrocycles." *CCS Chem.* 2024, 6, 2758–2769.
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356. S. Wu, J. Yang, Y. Ni, Y. Han, W. Chen\*, and J. Wu\* "Azatriangulenetrione as Anode Material for Sodium-Ion Batteries: Reversible Redox Chemistry Mediated by Lone Pair Electrons." *ACS Appl. Mater. Interfaces* 2024, 16, 39349–39355.
355. Y. Zhao, Y. Zhang, J. Yang\*, Y. Chen, G. Pu, Y. Wang, D. Li, W. Fan, M. Fang, J. Wu\* and Z. Li\*, "The Role of Locally Excited State and Charge Transfer State in Organic Room Temperature Phosphorescence and Corresponding Applications", *Adv. Opt. Mater.* 2024, 12, 2400980.
354. S. Moles Quintero, J. C. Mira-Martínez, Y. Zou, M. Díaz-García, P. G. Boj, J. Wu\*, M. A. Díaz-García\*, J. M. Marín-Beloqui\* and J. Casado\*, "Triplet formation inhibits amplified spontaneous emission in perylene-based polycyclic aromatic hydrocarbons." *J. Mater. Chem. C* 2024, 12, 5239-5246.
353. Y. Wang, S.-C. Chen, S. Tai, D. Wang, Y. Ma, J. Wu\* and M.-J. Lin\*, "Improving the performance and stability of perovskite solar cells via surface passivation of phthalimide N-alkylammonium iodides." *J. Mater. Chem. C* 2024, 12, 6540-6547.

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### Year 2023

351. W. Fan, T. M. Fukunaga, S. Wu, Y. Han, Q. Zhou, J. Wang, Z. Li, X. Hou, H. Wei, Y. Ni, H. Isobe,\* **J. Wu\***, “Synthesis and chiral resolution of a triply twisted Möbius carbon nanobelt”, *Nat. Synth.* **2023**, *2*, 880–887 (see [News & Views: Q. Miao, J. Casado, “Paradromic molecules”, Nat. Synth. 2023, 2, 808–810](#)).
350. T. Jiao, Y. Ni, T. Xu, X. Hou, S. Wu, L. Ren, Z. Sun\*, **J. Wu\***, “Synthesis of monolayer and persistent bilayer graphene fragments via a radical-mediated coupling approach”, *Nat. Synth.* **2023**, *2*, 1104–1115.
349. G.-F. Huo, T. M. Fukunaga, X. Hou, Y. Han, W. Fan, S. Wu,\* H. Isobe,\* **J. Wu\***, “Facile Synthesis and Chiral Resolution of Expanded Helicenes with up to 35 cata-Fused Benzene Rings”, *Angew. Chem. Int. Ed.* **2023**, *62*, e20221809 (selected as Hot Paper).
348. Y. Zou, X. Hou, H. Wei, J. Shao, Q. Jiang, L. Ren, **J. Wu\***, “Circumcoronenes”, *Angew. Chem. Int. Ed.* **2023**, *62*, e202301041 (selected as a VIP paper, highlighted by *Nat. Rev. Mater.*: <https://www.nature.com/articles/s41578-023-00555-z> and featured in *Angew. Chem.* **2023**, e202305289).
347. Q. Zhou, X. Hou, J. Wang, Y. Ni, W. Fan, Z. Li, X. Wei, K. Li, W. Yuan, Z. Xu, M. Zhu, Y. Zhao, Z. Sun\*, **J. Wu\***, “A Fused [5]Helicene Dimer with a Figure-Eight Topology: Synthesis, Chiral Resolution, and Electronic Properties”, *Angew. Chem. Int. Ed.* **2023**, *62*, e202302266 (selected as Hot Paper).
346. T. Shen, D. Dijkstra, A. Farrando-Pérez, P. G. Boj, J. M. Villalvilla, J. A. Quintana, Y. Zou, X. Hou, H. Wei, Z. Li, Z. Sun,\* M. A. Díaz-García\*, **J. Wu\***, “Fused Triangulene Dimers: Facile Synthesis by Intramolecular Radical-Radical Coupling and Application for Near Infrared Lasers”, *Angew. Chem. Int. Ed.* **2023**, *62*, e202304197 (selected as Hot Paper).
345. L. Ren, Y. Han, X. Hou, Y. Ni, Y. Zou, T. Jiao, **J. Wu\***, “Aromaticity in 2D Fully  $\pi$ -Conjugated Multicyclic Macrocycles”, *J. Am. Chem. Soc.* **2023**, *145*, 12398–12406.
344. T. Shen, Y. Zou, X. Hou, H. Wei, L. Ren, L. Jiao, **J. Wu\***, “Bis-*peri*-dinaphtho-rylenes: Facile Synthesis via Radical-Mediated Coupling Reactions and their Distinctive Electronic Structures”, *Angew. Chem. Int. Ed.* **2023**, *62*, e202311928 (selected as Hot Paper).
343. Z. Sun, W. Fan, Y. Han, W. Yuan, Y. Ni, J. Wang, H. Wei, Y. Zhao, Z. Sun,\* **J. Wu\***, “Helical fused 1,2:8,9-dibenzozethrene oligomers with up to 201° end-to-end twist: “One-pot” synthesis and chiral resolution.” *Chem. Sci.* **2023**, *14*, 7922-7927.
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341. M.-W. Wang, W. Fan, X. Li, Y. Liu, Z. Li, W. Jiang, **J. Wu\***, Z. Wang\*, “Molecular Carbons: How Far Can We Go?”, *ACS Nano* **2023**, *17*, 20734-20752.
340. S. Qiu, Y. Zhao, L. Zhang, Y. Ni, Y. Wu, H. Cong, D. Qu, W. Jiang, **J. Wu**, H. Tian, Z. Wang\*, “Axially N-Embedded Quasi-Carbon Nanohoops with Multioxidation States”, *CCS Chem.* **2023**, *5*, 1763-1772.
339. G. Merino\*, M. Solà\*, I. Fernández\*, C. Foroutan-Nejad\*, P. Lazzeretti\*, G. Frenking\*, H. L. Anderson, D. Sundholm, F. P. Cossío, M. A. Petrukhina, **J. Wu**, J. I. Wu, A. Restrepo, “Aromaticity: Quo Vadis”, *Chem. Sci.* **2023**, *14*, 5569-5576.
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### Year 2022

336. **J. Wu\*** (eds.), monograph “*Diradicaloids*” by Jenny Stanford Publishing (2022) (<https://www.routledge.com/Diradicaloids/Wu/p/book/9789814968089>).

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335. B. Zhang, S. Wu, X. Hou, G. Li, Y. Ni, Q. Zhang, J. Zhu, P. Wang, Z. Sun\* and J. Wu\*, "A Graphyne Spoked Wheel", *Chem* **2022**, *8*, 2831-2842 (Highlighted in [Synfacts](#); also see [Previews by J. M. Gottfried: Chem 8, 2571–2593](#)).
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331. H. Wei, X. Hou, T. Xu, Y. Zou, G. Li, S. Wu, Y. Geng, J. Wu\*, "Solution-Phase Synthesis and Isolation of An Aza-Triangulene and Its Cation in Crystalline Form", *Angew. Chem. Int. Ed.* **2022**, *61*, e202210386 (selected as a Hot Paper and Highlighted by [Chemistry World, Sep 05, 2022](#)).
330. Z. Li, X. Hou, Y. Han, W. Fan, Y. Ni, Q. Zhou, J. Zhu, S. Wu, K.-W. Huang, J. Wu\*, "[8]Cyclo-para-phenylmethine as A Super-Cyclooctatetraene: Dynamic Behavior, Global Aromaticity, and Open-Shell Diradical Character in The Neutral and Dicationic States". *Angew. Chem. Int. Ed.* **2022**, *61*, e202210697 (selected as a VIP paper).
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