

Yichun Wang, PhD

Keating-Crawford Collegiate Professor of Biomolecular Engineering,
University of Notre Dame, 240C McCourtney Hall West, Notre Dame, IN 46556, USA
Phone: 574-631-2617, E-mail: ywang65@nd.edu, Website: <https://yichun-wang-lab.com/>

EDUCATION

- Ph.D. Biomedical Engineering, University of Michigan**, Ann Arbor, 2016
- M.S. Biomedical Engineering, University of Michigan**, Ann Arbor, 2013
- B.S. Biological Sciences and Medical Engineering, Southeast University**, Nanjing, 2006

PROFESSIONAL APPOINTMENTS

University of Notre Dame – Notre Dame, IN

Keating-Crawford Collegiate Professor of Biomolecular Engineering And Associate Professor, Chemical and Biomolecular Engineering	2026-Present
Keating-Crawford Collegiate Professor of Biomolecular Engineering And Assistant Professor, Chemical and Biomolecular Engineering	2025-2026
Assistant Professor, Chemical and Biomolecular Engineering	2020-2025
Faculty Member, Materials Science and Engineering Program	2024-Present
Faculty Member, Berthiaume Institute for Precision Health (BIPH)	2021-Present
Faculty Member, Harper Cancer Research Institute (HCRI)	2021-Present
Faculty Member, NDnano	2020-Present
Faculty Member, Bioengineering Graduate Program	2020-Present

University of Michigan – Ann Arbor, MI

Postdoctoral Research Fellow <i>Lab of Prof. Angela Violi, Mechanical Engineering,</i> <i>Lab of Prof. Nicholas A. Kotov, Chemical Engineering</i> <i>Lab of Prof. J. Scott VanEpps, Emergency Medicine</i>	2016-2020
Graduate Research Assistant <i>Lab of Prof. Nicholas A. Kotov, Biomedical Engineering</i>	2011-2016
Visiting Scholar <i>Lab of Prof. Nicholas A. Kotov, Chemical Engineering</i>	2008-2010

3D Biomatrix, Inc – Ann Arbor, MI

Product Developer

2010-2011

Southeast University – Nanjing, China

Research Assistant

2006-2008

Lab of Prof. Zhongze Gu, State Key Laboratory of Bioelectronics

Undergraduate Researcher

2005-2006

*Lab of Prof. Zuhong Lu, State Key Laboratory of Bioelectronics***Nanjing First Hospital – Nanjing, China**

Magnetic Resonance Imaging Technician (intern)

2005

RESEARCH INTERESTS

My research interests are centered on advancing the fundamental understanding and application of multiscale material–bio interactions to develop next-generation therapeutic and diagnostic platforms.

- **Engineered Carbon Nanostructures:** Design of chiral and functional carbon nanomaterials to enhance molecular sensing, membrane transport, and targeted delivery for nanomedicine applications.
- **Therapeutic Extracellular Vesicles:** Engineering EVs for precision drug and gene delivery, immune modulation, and therapeutic intervention in cancer and neurodegenerative diseases.
- **3D Biomimetic Culture Platforms:** Development of physiologically relevant 3D tissue models for high-content/high-throughput screening, tumor modeling, and scalable biomanufacturing.

AWARDS AND HONORS

- ACS Nano Lectureship Award Finalist, 2026
- American Chemistry Society (ACS) PMSE Early Investigator Award, 2025
- National Institutes of Health (NIH) Innovations in Nanosystems and Nanotechnology (INN) Study Section Standing Member, 2025-2029
- BMES Cellular and Molecular Bioengineering Rising Star Award, 2025
- National Science Foundation (NSF) CAREER Award, 2024-2029
- Biomaterials Science Emerging Investigator Award, 2024
- NIH Maximizing Investigators' Research Award, 2023-2028
- NIH Selected Participant Early Career Reviewer (ECR) Program, 2023-2025
- Biointerfaces Institute Innovator Award, University of Michigan, 2019
- Discovery on Target Student Fellowship, Cambridge Healthtech Institute, 2015
- Finalist of "Science as Art" Competition, MRS Fall meeting, 2015
- Rackham Conference Travel Grant, University of Michigan, 2014
- CSC Scholarships, China Scholarship Council, 2008-2010
- Chien-Shiung Wu Honor Degree – Talented Young in Physics and Math, Southeast University, 2006

AWARDS TO MENTEES

- Patrick McKenzie, Notre Dame graduate student – Material Science Fellowship, 2026
- Tiago Thomaz Migliati Zanon, Notre Dame graduate student – LASER Leadership Fellowship, 2026
- Martin Nunez, Holy Cross College undergraduate student – HCRI SURF Fellowship, 2026
- Martin Nunez, Holy Cross College undergraduate student – BIPH Summer Fellowship, 2026
- James Johnston, Notre Dame graduate student – Leiva Fellowship, 2026
- Patrick McKenzie, Notre Dame graduate student – Kaneb Center Outstanding TA Award, 2026
- James Johnston, Notre Dame graduate student – Poster Award, CBE Graduate Symposium, 2025
- Farbod Shirinichi, Notre Dame graduate student – Poster Award, CBE Graduate Symposium, 2025
- Gaeun Kim, Notre Dame graduate student – HCRI IITP Award, 2025
- James Johnston, Notre Dame graduate student – Edison Innovation Fellowship, 2025
- Huo Yao, Notre Dame graduate student – Material Science Fellowship, 2025
- Aliciana Ilias, St. Mary College undergraduate student – HCRI Summer Fellowship, 2025
- Farbod Shirinichi, Notre Dame graduate student – BIPH Summer Fellowship, 2025
- Gaeun Kim, Notre Dame graduate student – Berry Family Foundation Fellowship, 2025
- Gaeun Kim, Notre Dame graduate student – Exceptional Mentor Award at HCRI, 2025
- Hyunsu Jeon, Notre Dame graduate student – Best Paper Award of CBE at Notre Dame, 2025
- Hyunsu Jeon, Notre Dame graduate student – Scientific Artificial Intelligence Fellowship, 2025
- Victor Lazkani, Notre Dame undergraduate student – NDnano Summer Fellowship, 2025
- Gaeun Kim, Notre Dame graduate student – Best Poster Award, COSE Research Symposium, 2024
- Gaeun Kim, Notre Dame graduate student – Best Poster Award, Soft Matter Symposia, 2024
- Hyunsu Jeon, Notre Dame graduate student – Leiva Fellowship, 2024
- Tiago Thomaz Migliati Zanon, Notre Dame graduate student – Material Science Fellowship, 2024
- Courtney Khong, Notre Dame graduate student – Kaneb Center Outstanding TA Award, 2024
- Jennifer Leon, Notre Dame undergraduate student – HCRI Summer Fellowship, 2024
- Swindar Zhou, Notre Dame undergraduate student – NDnano Summer Fellowship, 2024
- Hyunsu Jeon, Notre Dame graduate student – BIPH Summer Fellowship, 2023
- Hyunsu Jeon, Notre Dame graduate student – BIPH Best Poster Award, 2023
- James Johnston, Notre Dame graduate student – Best Poster Award, Soft Matter Symposia, 2023
- James Johnston, Notre Dame graduate student – Kaneb Center Outstanding TA Award, 2023
- Trevor Stone, Notre Dame undergraduate student – Departmental Undergrad Research Award, 2023
- James Johnston, Notre Dame graduate student – MERITS Fellowship, 2022
- Daniel Hernandez, Notre Dame undergraduate student – Galvin Scholarship, 2021

PUBLICATIONS

i10-index=27, Total citations=2310+ (Statistics from Google Scholar)

* - Wang, Y. as corresponding or co-corresponding author

† - Equally contributing authors

^U - Notre Dame undergraduate student

^G - Notre Dame graduate student

^P - Notre Dame postdoctoral research fellow

University of Notre Dame Affiliation

1. Liu, Y.^P; Zhu, R.^G; Ding, F.; Qu, Z.; **Wang, Y.*** "Antiviral Activity of Chiral Graphene Nanoparticles via Membrane Perturbation of Virus Envelope." *In preparation*
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Qu, Z.) contribution: Conceptualization, Methodology, Investigation.

2. Kim, G.^G; Wang, S.; Zhu, R.^G; Webber, M. J.; Lu, X.*; and **Wang, Y.*** “Dendritic Cell-Derived Small Extracellular Vesicles with High-efficiency siRNA Loading and Endosomal Escape for Synergistic T Cell Priming and Immune Checkpoint Blockade for Improved Adoptive T Cell Therapy” **Submitted**
Preprint: <https://doi.org/10.64898/2026.04.08.717283>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Xin L.) contribution: Resources, Methodology, Supervision.
3. Shirinichi, F.^{G,†}; Liu, Y.^{P,†}; Zhu, R.^G; Carpenter, J.; Zhang, W.; Yamil J. Colón, **Wang, Y.*** “Distinct Chiral Nanostructures of Graphene Quantum Dots Govern Divergent Passive and Active Enantioselective Transport across Biological Membranes” **Submitted**
Preprint: <https://doi.org/10.64898/2026.02.16.706189>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Colon, Y.) contribution: Software.
4. Johnston J.^G; Boyce, E.; Zanon, T. T. M.^G; Jeon, H.^G; Khong, C.^G; Nunez, M.^U; Pinkstaff, M.L.^U; Choi, Y.Y.; Myung, N.V.; **Wang, Y.*** “Music-Inspired Acoustic-Piezoelectric Stimulation Accelerates Extracellular Vesicle Production and Programs Therapeutic Function” *Acta Biomaterialia* 2026, 7, 3 (IF= 10.200, cites=0) <https://doi.org/10.64898/2026.03.11.711216>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Myung, N. V.) contribution: Methodology.
5. Shi, S.; Huang, Y. T.; Jeon, H.^G; Montes-Pinzon, D.; Taglione, A.; Hanjaya-Putra, D.; **Wang, Y.**; Huang, C. Y.; Chang, H. C. “Testing Drug Resistance of Hypoxic Quiescent Cells in Cancer Spheroid Screening Tests.” *APL Bioengineering* 2026, 10, 016113 (IF= 5.400, cites=0) <https://doi.org/10.1063/5.0304565>
My contribution: Methodology, Formal analysis, Resources, Writing - Review & Editing Supervision, Funding acquisition.
Collaborator (Huang, C. Y.; Chang, H. C.) contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
6. Kim, G.^G; Jeon, H.^G; Zhu, R.^G; Khong, C.^G; Johnston J.^G; Lu, X.; **Wang, Y.*** “M1 Macrophage-Derived Small Extracellular Vesicles as Synergistic Nanotherapeutics: Harnessing Intrinsic Anticancer Activity and Drug Delivery Capacity.” *Journal of Extracellular Vesicles* 2026, 15, 2, e70242 (IF= 16.500, cites=5) <https://doi.org/10.1101/2025.10.21.683755>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Xin L.) contribution: Resources, Supervision.
7. Kumar, S.; Sinclair, J. A.; Shi, S.; Kim, G.^G; Zhu, R.^G; Gasper, G.; **Wang, Y.**; Higginbotham, J. N.; Zhang, Q.; Jeppesen, D. K.; Tutanov, O.; Hamilton, M.; Franklin, J. L.; Charest, A.; Coffey, R. J.; Senapati, S.; Chang, H. C.* Isolation- and Label-free Detection of Supermeres: A Superior Biomarker for Colorectal Cancer. *Scientific Reports* 2026, 1, 22 (IF= 3.900, cites=0) <https://doi.org/10.1038/s41598-026-36626-8>
My contribution: Resources, Writing - Review & Editing, Supervision.
Collaborator (Huang, C. Y.; Chang, H. C.) contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
8. Liu, Y.^P; Kim, G.^G; Zhu, R.^G; Jeon, H.^G; **Wang, Y.*** “A Chiral Nanoassembly Platform for Deep and Hypoxia-Resistant Cancer Photodynamic Therapy” *Journal of Controlled Release* 2026, 390, 114572 (IF= 12.400, cites=5) <https://doi.org/10.1016/j.jconrel.2025.114572>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.

9. Shirinichi, F.^G; Gao, Y.^P; Webber, M. J.; **Wang, Y.*** “Recent Advances in Sensing Technologies for Detecting Fentanyl and Its Analogues: Challenges and Future Directions.” *Sensors and Actuators Reports* 2025, 10, 100386 (IF= 7.600, cites=1) <https://doi.org/10.1016/j.snr.2025.100386>
My contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Webber, M. J.) contribution: Writing - Review & Editing.
10. Jeon, H.^G; Kim, G.^G; Carpenter, J.; Colon, Y.; **Wang, Y.*** “Automated High-Content, High-Throughput Spatial Analysis Pipeline for Drug Screening in 3D Tumor Spheroid Inverted Colloidal Crystal Arrays.” *ACS Applied Materials & Interfaces* 2025, 8, 9 (IF= 8.500, cites=9) <https://doi.org/10.1021/acsami.5c10049>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Colon, Y.) contribution: Software.
11. Zhu, R.^G; Kim, G.^G; Rajewski, B.; Angera, I.; Del Valle, J. and **Wang, Y.*** “N-Amino Peptide-Graphene Quantum Dot Loaded Small Extracellular Vesicles for Targeted Therapy of Tauopathies.” *Advanced NanoBiomed Research* 2025, 7, 2500065 (IF= 4.400, cites=1) <https://doi.org/10.1002/anbr.202500065>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Del Valle, J.) contribution: Resources, Supervision, Writing - Review & Editing.
12. Jeon, H.^G; Zanon, T. T. M.^G; Carpenter, J.; Ilias, A.^U; Colon, Y.; **Wang, Y.*** “A Bioinert Hydrogel Framework for Precision 3D Cell Cultures: Advancing Automated High-Content and High-Throughput Drug Screening.” *Small Science* 2025, 4, 5 (IF= 11.200, cites=8) <https://doi.org/10.1002/smssc.202400440>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Colon, Y.) contribution: Software.
13. Kim, G.^G; Zhu, R.^G; Yu, S.; Fan, B.; Leon, J.^U; Webber, M. J.; **Wang, Y.*** “Enhancing Gene Delivery to Breast Cancer with Highly Efficient siRNA Loading and pH-Responsive Small Extracellular Vesicles.” *ACS Biomaterials Science & Engineering* 2025, 11, 1, 213–227 (IF= 5.500, cites=8) <https://doi.org/10.1021/acsbiomaterials.4c01595>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Webber, M. J.) contribution: Supervision, Writing - Review & Editing.
14. Gao, Y.^{P,†}; Shirinichi, F.^{G,†}; Hansrisuk, A.; Zhu, R.^G; Xian, S.; Lieberman, M.; Webber, M. J.; **Wang, Y.*** “A Supramolecular–Quantum Dot System for Broad-Spectrum Detection of Fentanyl Analogues.” *Small* 2024, 12, 20 (IF= 13.400, cites=3) <https://doi.org/10.1002/smll.202407702>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Webber, M. J.; Lieberman, M.) contribution: Resources, Writing - Review & Editing.
15. Johnston J.^{G,†}; Jeon, H.^{G,†}; Choi, Y. Y.; Kim, G.^G; Shi, T.; Khong, C.^G; Chang, H. C.; Myung, N. V.; and **Wang, Y.*** “Stimulated 3D Cell Culture for Enhanced Production of Small Extracellular Vesicles Using a Piezoelectric Nanofibrous Scaffold.” *Biomater. Sci.* 2024,12, 5728-5741 (IF= 6.600, cites=3) <http://10.1039/D4BM00504J>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Chang, H. C.; Myung, N. V.) contribution: Resources, Supervision.
This article was featured in the **Biomaterials Science Emerging Investigators** series.

16. Gao, Y. ^P; Chen, J.; Liu, J.; Li, M.; **Wang, Y.*** "Deposition of DNA Nanostructures on Highly Oriented Pyrolytic Graphite." *Advanced Materials Interfaces* 2024, 8, 13 (IF= 4.300, cites=5) <https://doi.org/10.1002/admi.202400557>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Li, M.) contribution: Methodology, Resources.
17. Kim, G^G; Zhu, R^G; Zhang, Y^P; Jeon, H^G; Shirinchi, F^G; **Wang, Y.*** "Fluorescent Chiral Quantum Dots to Unveil Origin-Dependent Exosome Uptake and Cargo Release." *ACS Applied Bio Materials* 2024 7, 5 (IF= 5.700, cites=13) <https://doi.org/10.1021/acsabm.4c00296>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
18. Zhu, R. ^G; Stone T. ^U; **Wang, Y.*** The Role of Shear Rates on Amyloid Formation from Biofilm Peptides Phenol Soluble Modulins. *Biophysical Journal* 2024, 123, 9, 1106-1115 (IF= 3.400, cites=2) <https://doi.org/10.1016/j.bpj.2024.03.036>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
19. Gao, Y. ^P; **Wang, Y.*** "Interplay of Graphene-DNA Interactions: Unveiling Sensing Potential for Graphene Materials". *Applied Physics Reviews* 2024, 11, 011306 (**Selected as Featured Article**) (IF= 18.001, cites=25) <https://doi.org/10.1063/5.0171364>
My contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
This review article was part of the special issue in "**New Carbon Materials**".
20. Carbonel, H.; Mikulski, T.D.; Nugraha, K.; Johnston, J. ^G; **Wang, Y.**; Brown, S.N. "Optically Active Bis(aminophenols) and Their Metal Complexes." *Dalton Transactions* 2023, 52, 13290-13303 (IF= 4.569, cites=2) <https://doi.org/10.1039/D3DT02436A>
My contribution: Methodology, Formal analysis;
Collaborator (Brown, S.N.) contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
21. Zhu, R ^G; Makwana, K.M.; Zhang, Y. ^P; Rajewski, B. H.; Del Valle, J. and **Wang, Y.*** "Blocking Tau Transmission by Biomimetic Graphene Nanoparticles." *Journal of Materials Chemistry B* 2023, 11, 7378 – 7388 (IF= 7.571, cites=11) <https://doi.org/10.1039/D3TB00850A>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
Collaborator (Del Valle, J.) contribution: Supervision, Writing - Review & Editing.
This article was featured in *J. Mater. Chem. B* "**2023 Most Popular Articles collection**".
22. Jeon, H. ^G; Zhu, R. ^G; Kim, G. ^G; **Wang, Y.*** "Chirality-Enhanced Transport and Drug Delivery of Graphene Nanocarriers to Tumor-like Cellular Spheroid." *Frontiers in Chemistry* 2023, 11 (IF= 5.545, cites=20) <https://doi.org/10.3389/fchem.2023.1207579>
My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
23. Johnston J. ^G; Stone T. ^U; **Wang, Y.*** "Biomaterial-Enabled 3D Cell Culture Technologies for Extracellular Vesicle Manufacturing." *Biomater. Sci.*, 2023, 11(IF= 6.600, cites=19) <https://doi.org/10.1039/D3BM00469D>
My contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.
24. Zhang, Y. ^P; Kim, G. ^G; Zhu, Y. ^G; Wang, C.; Zhu, R. ^G; Lu, X.; Chang, H. C. and **Wang, Y.*** "Chiral Graphene Quantum Dot Enhanced Drug Loading into Small Extracellular Vesicles." *ACS Nano* 2023, 5 (IF= 17.10, cites=51)

<https://doi.org/10.1021/acsnano.3c00305>

My contribution: Conceptualization, Methodology, Formal analysis, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.

Collaborator (Chang, H. C.) contribution: Supervision, Writing - Review & Editing.

25. Elvati P.[†]; Luyet C.[†]; **Wang Y.[†]**; Liu C.; VanEpps, J.S.; Kotov, N.A.; Violi, A. "Molecular Architecture and Helicity of Bacterial Amyloid Nanofibers: Implications for the Design of Nanoscale Antibiotics." *ACS Applied Nano Materials* 2023, 6, 8, 6594–6604. (IF= 6.140, cites=1)
<https://doi.org/10.1021/acsanm.3c00174>

My contribution: Conceptualization, Methodology, Investigation, Formal analysis, Resources, Writing - Original Draft; my graduate student, Runyao Zhu contributed in Validation (see Acknowledgement of the manuscript).

Collaborator (Violi, A.; Kotov, N.A.; VanEpps, J.S.) contribution: Conceptualization, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.

26. **Wang, Y.*** and Jeon, H.[‡] "Three-Dimensional Cell Cultures toward Quantitative High-Throughput Cancer Drug Screening." *Trends in Pharmacological Sciences* 2022, 43, 11-24. (IF=17.638, cites=123)
<https://doi.org/10.1016/j.tips.2022.03.014>

My contribution: Conceptualization, Methodology, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.

27. Barani, N.; Sarabandi, K.; Kotov, N. A.; VanEpps, J.S.; Elvati, P.; **Wang, Y.**; Violi, A. "Multiphysics Modeling Electromagnetic Signaling Phenomena at kHz-GHz Frequencies in Bacterial Biofilms." *IEEE Access* 2022, 10, 39344 – 39361. (IF=3.900, cites=7)
<https://doi.org/10.1109/ACCESS.2022.3165028>

My contribution: Methodology, Investigation, Software, Writing - - Review & Editing.

Collaborator (Violi, A.; Kotov, N.A.; VanEpps, J.S.) contribution: Conceptualization, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition

28. Choi W.J.; Yano K.; Cha M.; Colombari F.; **Wang Y.**; Lee S.H.; Sun, K.; Kruger, J. M.; de Moura, A. F.; Kotov, N. A. "Chiral Phonons in Microcrystals and Nanofibrils of Biomolecules." *Nature Photonics* 2022, 3, 21 4. (IF= 39.728, cites=120)
<https://doi.org/10.1038/s41566-022-00969-1>

My contribution: Methodology, Investigation, Software, Writing - - Review & Editing.

Collaborator (de Moura, A. F.; Kotov, N.A.) contribution: Conceptualization, Resources, Writing - Original Draft, Supervision, Project administration, Funding acquisition.

Prior to University of Notre Dame

29. Ragazzon, G.; Cadranel, A.; Ushakova, E.V.; **Wang, Y.**; Guldi, D.M.; Rogach, A. L.; Kotov, N.A.; Prato, M. "Optical Processes in Carbon Nanocolloids." *Chem* 2021, 7, 3 606-628. (IF= 25.832, cites=103)
<https://doi.org/10.1016/j.chempr.2020.11.012>

30. Demirci, H.; **Wang, Y.**; Li, Q.; Lin, C.; Beatrice, A. D.; Guo, J. L.; Kotov, N. A. "Penetration of Carbon Nanotubes into the Retinoblastoma Tumor after Intravitreal Injection in LHBETATAG Transgenic Mice Retinoblastoma Model." *Journal of Ophthalmic and Vision Research* 2020, 15, 4 446–452. (IF=3.39, cites=13) <https://doi.org/10.18502/jovr.v15i4.7778>

31. Feng, W.; Kadiyala, U.; Yan, J.; **Wang, Y.**; DiRita, V.; VanEpps, J.S.; Kotov, N.A. "Plasmonic Nanoparticles Assemblies Templated by Helical Bacteria and Resulting Optical Activity." *Chirality* 2020, 32, 7 899-906. (IF= 2.183, cites=5) <https://doi.org/10.1002/chir.23225>.

32. **Wang, Y.**; Kadiyala, U.; Qu, Z.; Elvati, P.; Altheim, C.; Kotov, N. A.; Violi, A.; VanEpps, J. S. "Anti-Biofilm Activity of Graphene Quantum Dots via Self-Assembly with Bacterial Amyloid Proteins." *ACS Nano* 2019, 13, 4278–4289. (IF= 17.10, cites=117) <https://doi.org/10.1021/acsnano.8b09403>

33. **Wang, Y.***; Bahng, J. H.; Kotov, N. A. "Three-Dimensional Biomimetic Scaffolds for Hepatic Differentiation of Size-Controlled Embryoid Bodies." *J. Mater. Res.* 2019, 34, 1371-1380. (IF= 5.039, cites=10) <https://doi.org/10.1557/jmr.2019.80>
34. Qu, Z.; Feng, W.; **Wang, Y.**; Kotov, N. A. "Diverse Nanoassemblies of Graphene Quantum Dots and Their Mineralogical Counterparts." *Angewandte Chemie* 2019, 10. (IF= 16.60, cites=36) <https://doi.org/10.1002/anie.201908216>
35. Liu, C.; Elvati, P.; Majumder, S.; **Wang, Y.**; Liu, A.; Violi, A. "Predicting the Time of Entry of Nanoparticles in Cellular Membranes." *ACS Nano* 2019, 13, 9, 10221-10232. (IF=17.10, cites=32) <https://doi.org/10.1021/acsnano.9b03434>
36. **Wang, Y.***; Jan, E.; Cuddihy, M.; Bahng, J. H.; Kotov, N. "Layered Biomimetic Nanocomposites Replicate Bone Surface in Three-Dimensional Cell Cultures." *Nanocomposites* 2018, 4, 156-166. (IF= 5.0, cites=10) <https://doi.org/10.1080/20550324.2018.1556895>
37. Jiang, S.; Chekini, M.; Qu, Z.-B.; **Wang, Y.**; Yeltik, A.; Liu, Y.; Kotlyar, A.; Zhang, T.; Li, B.; Demir, H. V.; et al. "Chiral Ceramic Nanoparticles and Peptide Catalysis." *J. Am. Chem. Soc.* 2017, 139, 13701-13712. (IF= 15.0, cites=136) <https://doi.org/10.1021/jacs.7b01445>
38. Suzuki, N.; **Wang, Y.**; Elvati, P.; Qu, Z.-B.; Kim, K.; Jiang, S.; Baumeister, E.; Lee, J.; Yeom, B.; Bahng, J. H.; et al. "Chiral Graphene Quantum Dots." *ACS Nano* 2016, 10, 1744-1755. (IF=17.10, cites=365) <https://doi.org/10.1021/acsnano.5b06369>
39. **Wang, Y.**; Bahng, J. H.; Che, Q.; Han, J.; Kotov, N. A. "Anomalously Fast Diffusion of Targeted Carbon Nanotubes in Cellular Spheroids." *ACS Nano* 2015, 9, 8231-8238. (IF=17.10, cites=34) <https://doi.org/10.1021/acsnano.5b02595>
40. Bahng, J. H.; Yeom, B.; **Wang, Y.**; Tung, S. O.; Hoff, J. D.; Kotov, N. A. "Anomalous dispersions of 'hedgehog' particles." *Nature* 2015, 7536, 596-599. (IF=69.5, cites=158) <https://doi.org/10.1038/nature14092>
41. Cuddihy, M.; **Wang, Y.**; Machi, C.; Bahng, J. H.; Kotov, N. A. "Replication of Bone Marrow Differentiation Niche: Comparative Evaluation of Different Three-Dimensional Matrices." *Small* 2013, 9, 1008-1015. (IF= 15.15, cites=30) <https://doi.org/10.1002/smll.201202133>
42. **Wang, Y.**; Tang, Z.; Feng, Z.; Xie, Z.; Gu, Z. "Stretched Inverse Opal Colloid Crystal Substrates-Induced Orientation of Fibroblast." *Biomed. Mater.* 2010, 5, 35011. (IF= 3.715, cites=15) <https://doi.org/10.1088/1748-6041/5/3/035011>
43. Feng, Z.; Lu, H.; Leach, M. K.; Huang, N.; **Wang, Y.**; Liu, C.; Gu, Z. "The Influence of Type-I Collagen-Coated PLLA Aligned Nanofibers on Growth of Blood Outgrowth Endothelial Cells." *Biomed. Mater.* 2010, 5, 65011. (IF= 3.715, cites=41) <https://doi.org/10.1088/1748-6041/5/6/065011>
44. Feng, Z.; Chu, X.; Huang, N.; Leach, M. K.; Wang, G.; **Wang, Y.**; Ding, Y.; Gu, Z. "Rat Hepatocyte Aggregate Formation on Discrete Aligned Nanofibers of Type-I Collagen-Coated Poly (L-Lactic Acid)." *Biomaterials* 2010, 31, 3604-3612. (IF= 15.3, cites=79) <https://doi.org/10.1016/j.biomaterials.2010.01.080>
45. Feng, Z.; Leach, M. K.; Chu, X.; **Wang, Y.**; Tian, T.; Shi, X.; Ding, Y.; Gu, Z. "Electrospun Chitosan Nanofibers for Hepatocyte Culture." *J. Biomed. Nanotechnol.* 2010, 6, 658-666. (IF=3.45, cites=45) <https://doi.org/10.1166/jbn.2010.1159>

46. Feng, Z.; Chu, X.; Huang, N.; Wang, T.; **Wang, Y.**; Shi, X.; Ding, Y.; Gu, Z. "The Effect of Nanofibrous Galactosylated Chitosan Scaffolds on the Formation of Rat Primary Hepatocyte Aggregates and the Maintenance of Liver Function." *Biomaterials* 2009, 30, 2753–2763.
(IF=15.3, cites=267) <https://doi.org/10.1016/j.biomaterials.2009.01.053>
47. Tang, Z.; Gao, J.; He, C.; **Wang, Y.** "Establishment of Immortalized B Lymphoblast Cell Line from Patients with Hepatitis B Virus Infection." *Journal of Medical Research* 2008, 9, 23-26
(IF= 2.628, cites=2)
48. **Wang, Y.**; Xie, Z.; Tang, Z.; Gu, Z. "Photonic Crystal Monitoring Cell Growth Status." *International Workshop on Bioelectronics and Biomaterials* 2008, 315–316.
49. **Wang, Y.**; Tang, Z.; Gu, Z. 3D "Porous Materials for Cell Cultivation." *The 14th China-Japan Bilateral Symposium on Intelligent Electrophonic Materials and Molecular Electronics* 2007, 265–267.

INVITED TALKS AND SEMINARS

University of Notre Dame Affiliation, Given Externally

1. **Wang, Y.** Invited talk "Distinct Chiral Nanostructures of Graphene Quantum Dots and Their Enantioselective Transport in Biological Systems." AIChE 2026, NSEF 'Chiral Nanomaterials' Session, Minneapolis, MN (*To be given*)
2. **Wang, Y.** Invited lecture "3D Cell Culture Systems in Drug Discovery and Drug Screening." Young Scientists Forum in the 3rd International Conference of Molecular Engineering of Polymers (MEP-3), September 2026, Shanghai, China (*Declined due to time conflict*)
3. **Wang, Y.** Seminar "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles." Washington University, St. Louis, Department of Biomedical Engineering, September 2026, St. Louis, MO (*To be given*)
4. **Wang, Y.** Invited talk "Distinct Chiral Nanostructures of Graphene Quantum Dots Govern Divergent Passive and Active Enantioselective Transport across Biological Membranes." ACS Fall Meeting 2026, Symposium on carbon-based nanomaterials: from fundamental insights to applications Chicago, IL (*To be given*)
5. **Wang, Y.** Invited talk "A Supramolecular–Quantum Dot Fluorescence Displacement Sensor for Rapid, Portable, and Broad-Spectrum Detection of Fentanyl Analogs." Electronic and Photonic Devices and Systems, 249th ECS Meeting, May 2026, Seattle, WA (*To be given*)
6. **Wang, Y.** Invited talk "Nanochirality-Engineered Carbon Quantum Dots for Enhanced Electron Transfer and Biological Transport in Deep-Tissue Therapeutics." Carbon Nanostructures and Devices, 249th ECS Meeting, May 2026, Seattle, WA (*To be given*)
7. **Wang, Y.** Invited talk "Translational Applications of Multifunctional Therapeutic Small Extracellular Vesicles" TechConnect World Conference, March 2026, Raleigh, NC
8. **Wang, Y.** Invited talk "Advanced In Vitro Models in Cancer Drug Screening: 3D Cell Culture Systems" Cancer Centre-Bischoff Research Seminar, March 2026. Virtual
9. **Wang, Y.** Invited talk "Tuning Chirality of Graphene Quantum Dots to Empower Medical Imaging and Theranostic Applications." New Era of Chiral Light-Matter Interaction Effects, Pacifichem 2025, December 2025, Honolulu, HI

10. **Wang, Y. Invited lecture** "3D Cell Culture Systems in Drug Discovery." Biotechnology Programs, College of Natural and Mathematical Sciences, University of Maryland, October 2025, Baltimore, MD
11. **Wang, Y. Seminar** "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles." John Hopkins University Department of Chemical & Biomolecular Engineering, September 2025, Baltimore, MD
12. **Wang, Y. Invited award talk** "Engineering Biomimetic Polymeric Framework for High-Content and High-Throughput Microphysiological Systems to Advance Drug Discovery" PMSE Early Investigator Award, ACS Fall, August 2025, Washington DC
13. **Wang, Y. Invited talk** "Chiral Quantum Dots Enhanced Small Extracellular Vesicles for Gene Delivery." CRS Annual Meeting, July 2025, Philadelphia, PA
14. **Wang, Y. Invited talk** "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles for Cancer Treatment." Cancer Nanotechnology Gordon Research Conference (GRC), June 2025, Lucca, Italy
15. **Wang, Y. Invited talk** "Supramolecular-Quantum Dot Sensors: A Rapid and Broad-Spectrum Platform for Fentanyl and Analogue Detection." Solid State Electronics and Photonics in Biology and Medicine Symposium, 247th ECS Meeting, May 2025, Montreal, Canada
16. **Wang, Y. Invited talk** "Precision Targeted NAP-Graphene Quantum Dot Complex for Overcoming Tau Pathology in Neurodegenerative Diseases." Carbon Nanostructures in Medicine and Biology Symposium, 247th ECS Meeting, May 2025, Montreal, Canada
17. **Wang, Y. Invited lecture** "Engineering Chiral Graphene Quantum Dots for Enhanced Biointerface Interactions and Therapeutic Delivery." International Conference on Frontier Materials Conference 2025, April 2025, Wuxi, China. *Virtual*
18. **Wang, Y. Invited award talk** "Enhancing Therapeutic Exosomes: High-Efficiency Drug Loading and Large-Scale Production Using Biomimetic Materials." BMES CMBE Conference, January 2025, San Diego, CA
19. **Wang, Y. Invited talk** "Enhancing Therapeutic Exosomes: High-Efficiency Drug Loading and Large-Scale Production Using Biomimetic Materials." 8th Bioengineering and Translational Medicine Conference, October 2024, San Diego, CA
20. **Wang, Y. Seminar** "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles." UCLA Department of Chemical & Biomolecular Engineering, October 2024, Los Angeles, CA
21. **Wang, Y. Seminar** "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles." University of Illinois Chicago Department of Pharmaceutical Sciences, October 2024, Chicago, IL
22. **Wang, Y. Seminar** "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Small Extracellular Vesicles." Rice University Department of Bioengineering, September 2024, Houston, TX
23. **Wang, Y. Invited talk** "Tuning Chirality of Graphene Quantum Dots to Empower Medical Imaging and Theranostic Applications." Solid State Electronics and Photonics in Biology and Medicine Symposium, 245th ECS Meeting, May 2024, San Francisco, CA

24. **Wang, Y.** Invited talk "Chiral Graphene Quantum Dot Enhanced Drug Loading into Exosomes." Carbon Nanostructures in Medicine and Biology Symposium, 245th ECS Meeting, May 2024, San Francisco, CA
25. **Wang, Y.** Invited talk "Enhancing therapeutic exosomes: High-efficiency drug loading and large-scale production using biomimetic materials." Division of Biochemical Technology, ACS Spring 2024, New Orleans, LA
26. **Wang, Y.** Invited talk "Smart Microgel-Well System 3D Cell Culture System for Dynamic High-Throughput Drug Screening." Thematic session "Biomicrofluidics and Bioprinting", IEEE NANOMED, December 2023, Okinawa, Japan (unable to present due to visa)
27. **Wang, Y.** Seminar "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Exosomes." Wayne State University Department of Chemical Engineering, October 2023, Detroit, MI
28. **Wang, Y.** Seminar "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Exosomes", New Jersey Institute of Technology Department of Chemical and Materials Engineering, October 2023, Newark, NJ
29. **Wang, Y.** Seminar "A Convergent Bioengineering Platform for Multifunctional Therapeutic Extracellular Vesicles." Syracuse University Department of Biomedical and Chemical Engineering, September 2023, Syracuse, NY
30. **Wang, Y.** Invited talk "Inverted Colloidal Crystal Hydrogel Scaffold as Extracellular Matrix Mimics." Notre Dame-Purdue Soft Matter & Polymers Symposium, October 2022. Notre Dame, IN
31. **Wang, Y.** Seminar "Rational Design of Nanotherapeutics Targeting Extracellular Matrix and Interfaces." University of Toledo Department of Physics and Astronomy, April 2022. Toledo, OH
32. **Wang, Y.** Seminar "Rational Design of Nanotherapeutics Inspired by Extracellular Matrix of Multicellular system." Auburn University Department of Material Engineering, March 2022. Auburn, AL
33. **Wang, Y.** Invited talk "Biofilm Extracellular Matrix Protein: From Functional Amyloids to Versatile Biomaterials." AIChE Annual Meeting November 2021. Boston, MA *Virtual*
34. **Wang, Y.** Seminar "Rational Design of Nanotherapeutics Targeting Multiscale Extracellular Matrix and Interfaces." University of California Riverside Department of Bioengineering, January 2021. *Virtual*

University of Notre Dame Affiliation, Given at Notre Dame

35. **Wang, Y.** Invited talk "Engineered 3D Culture Systems for High-content and High-throughput Microphysiological Systems to Advance Drug Discovery" Warren Center Lecture Like A Champion, March 2026. Notre Dame, IN
36. **Wang, Y.** Invited talk "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Exosomes." Berthiaume Institute for Precision Health 2024 External Advisory Board Meeting, October 2024. Notre Dame, IN
37. **Wang, Y.** Invited talk "Engineering Biomimetic Materials to Empower Multifunctional Therapeutic Exosomes." NDnano, March 2024. Notre Dame, IN
38. **Wang, Y.** Invited talk "Unravelling Multiscale Transport in Cancerous Tumor." Harper Cancer Institute, Research Cures Cancer Seminar, March 2021. Notre Dame, IN

39. **Wang, Y.** Invited talk “Convergent Design of Nanotherapeutic and Biomimetic Materials Targeting Extracellular Matrix.” NDnano, November 2020. Notre Dame, IN

Prior to University of Notre Dame

40. **Wang, Y.** Invited award talk “Anti-biofilm Activity of Graphene Quantum Dots via Self-Assembly with Bacterial Amyloid Proteins.” Biointerfaces Institute, University of Michigan, March 2019. Ann Arbor, MI

SELECTED CONFERENCE PRESENTATIONS

Presenting author underlined

U - Notre Dame Undergraduate student

G - Notre Dame Graduate student

P - Notre Dame Postdoctoral research fellow

University of Notre Dame Affiliation

1. **Wang, Y.** “Engineering Nanoscale Chirality for Enhanced Bio-Interactions in Imaging and Therapy.” Chirality Annual Conference, July 2025, New York City, NY
2. **Wang, Y.** “Engineered Biomimetic Materials for Enhancing Therapeutic Small Extracellular Vesicles.” Society for Biomaterials (SFB) 2025, April 2025, Chicago, IL
3. **Wang, Y.** “Stimulated 3D Cell Culture for Enhanced Production of Small Extracellular Vesicles Using a Piezoelectric Nanofibrous Scaffold.” Division of Colloid and Surface Chemistry, ACS Fall 2024, August 2024, Denver, CO
4. **Wang, Y.** “Chiral Graphene Quantum Dots Enhanced Drug Loading into Exosomes.” Division of Colloid and Surface Chemistry, ACS Spring 2024, March 2024, New Orleans, LA
5. Jeon, H.^G; **Wang, Y.** “High-Throughput Multiphoton Imaging and Automated Processing for Therapy Assessment in Tumor Spheroid Ensembles”, 10th Annual Midwest Imaging and Microanalysis Workshop, May 2025, Notre Dame, IN.
6. Jeon, H.^G; Kim, G.^G; Carpenter, J.^G; Colón, Y.J.; **Wang, Y.**, “Automated High-Content, High-Throughput Spatial Drug Screening in 3D Tumor Spheroid Inverted Colloidal Crystal (iCC) Arrays”, 10th Annual ND-Purdue Soft Matter & Polymers Symposium, Nov. 2025, West Lafayette, IN.
7. Zanon, T.T.M.^G; Jeon, H.^G; **Wang, Y.** “Metastasis Prostate Cancer Spheroids Model in High-Throughput High-Content Domain.” ND/Purdue Soft Matter and Polymers Symposium, October 2025, West Lafayette, IN.
8. Montero, A.^U; Zanon, T.T.M.^G; Jeon, H.^G; **Wang, Y.** “Leveraging the iCC Framework for High-Content High-Throughput Modeling of Penile Metastasis of Prostate Cancer.” Summer Undergraduate Research Symposium, July 2025, Notre Dame, IN.
9. Zanon, T.T.M.^G; Jeon, H.^G; **Wang, Y.** “Metastasis Prostate Cancer Spheroids Model in High-Throughput High-Content Domain.” Harper Cancer Research Day, April 2025, Notre Dame, IN.
10. Zanon, T.T.M.^G; Jeon, H.^G; **Wang, Y.** “Metastasis Prostate Cancer Spheroids Model in High-Throughput High-Content Domain.” Q-Bio@ND & EMBRIO Joint Symposium, April 2025, Notre Dame,

IN.

11. [Shirinichi, F.](#)^G; [Liu, Y.](#)^P; [Zhu, R.](#)^G; [Carpenter, J.](#)^G; [Zhang, W.](#)^P; [Colón, Y. J.](#); **Wang, Y.** “Distinct Chiral Nanostructures of Graphene Quantum Dots Govern Divergent Passive and Active Enantioselective Transport across Biological Membranes” BIPH Annual Poster session, October 2025, South Bend, IN
12. [Shirinichi, F.](#)^G; [Liu, Y.](#)^P; [Zhu, R.](#)^G; [Carpenter, J.](#)^G; [Zhang, W.](#)^P; [Colón, Y. J.](#); **Wang, Y.** “Distinct Chiral Nanostructures of Graphene Quantum Dots Govern Divergent Passive and Active Enantioselective Transport across Biological Membranes” 10th Annual Notre Dame-Purdue Soft Matter & Polymers Symposium and Poster Session. November 2025 West Lafayette, IN
13. [Gao, Y.](#)^P; [Shirinichi, F.](#)^G; [Hansrisuk, A.](#)^G; [Zhu, R.](#)^G; [Xian, S.](#)^G; [Lieberman, M.](#); [Webber, M.](#) **Wang, Y.** A Supramolecular–Quantum Dot System for Broad-Spectrum Detection of Fentanyl Analogs. COSE-Research Horizons Symposium’25. December 2025, South Bend, IN
14. [Gao, Y.](#)^P; [Shirinichi, F.](#)^G; [Hansrisuk, A.](#)^G; [Zhu, R.](#)^G; [Xian, S.](#)^G; [Lieberman, M.](#); [Webber, M.](#) **Wang, Y.** Fluorescence Switching Sensor for Fentanyl and Fentanyl Analog Detection Using Graphene Quantum Dots and CB [7]. In 2025 AIChE Annual Meeting. AIChE. November 2025 Boston, MA
15. [Johnston, J.](#)^G; [Jeon, H.](#)^G; [Choi, Y.Y.](#); [Kim, G.](#)^G; [Shi, T.](#); [Khong, C.](#)^G; [Chang, H. C.](#); [Myung, V. N.](#) **Wang, Y.** “Piezoelectric Nanofibrous Scaffold as a 3D Culture Platform for Enhancing the Production of Small Extracellular Vesicles.” Society for Biomaterials (SFB) 2025, April 2025, Chicago, IL
16. [Johnston, J.](#)^G; [Jeon, H.](#)^G; [Choi, Y.Y.](#); [Kim, G.](#)^G; [Shi, T.](#); [Khong, C.](#)^G; [Chang, H. C.](#); [Myung, V. N.](#) **Wang, Y.** “Piezoelectric Nanofibrous Scaffold as a 3D Culture Platform for Enhancing the Biogenesis of Small Extracellular Vesicles.” BIPH annual symposium, April 2025, Notre Dame, IN.
17. [Johnston, J.](#)^G; [Jeon, H.](#)^G; [Choi, Y.Y.](#); [Kim, G.](#)^G; [Shi, T.](#); [Khong, C.](#)^G; [Chang, H. C.](#); [Myung, V. N.](#) **Wang, Y.** “Piezoelectric Nanofibrous Scaffold as a 3D Culture Platform for Enhancing the Production of Small Extracellular Vesicles.”, HCPI cancer research day, Notre Dame, IN.
18. [Johnston, J.](#)^G; [Boyce, E.](#); [Khong, C.](#)^G; [Nunez, M.](#); [Choi, Y.Y.](#); [Myung, N. V.](#); **Wang, Y.** “Stimulative Piezoelectric Nanofibrous Scaffold for Understanding the Effect of Music on Macrophage Cells.” BIPH Annual Board Meeting, Notre Dame, IN.
19. [Johnston, J.](#)^G; [Jeon, H.](#)^G; [Kim, G.](#)^G; [Shi, T.](#); [Khong, C.](#)^G; [Choi, Y.Y.](#); [Chang, H. C.](#); [Myung, V. N.](#) **Wang, Y.** “Stimulative Piezoelectric Nanofibrous Scaffold for Enhancing the Biogenesis of Small Extracellular Vesicles” ND/Purdue Soft Matter Symposium, November 2025, West Lafayette, IN.
20. [Kim, G.](#)^G; [Jeon, H.](#)^G; [Chao, A.](#); [Johnston, J.](#)^G; [Zhu, R.](#)^G; [Khong, C.](#)^G; [Liu, Y.](#)^P; [Liang, M.](#); [Lu, X.](#); **Wang, Y.** “Functional Evaluation of M1 Macrophage-Derived Small Extracellular Vesicles in Anticancer and Synergistic Targeted Drug Delivery” 10th Notre Dame-Purdue Symposium on Soft Matter & Polymers, Nov 2025, West Lafayette, IN
21. [Kim, G.](#)^G; [Jeon, H.](#)^G; [Chao, A.](#); [Johnston, J.](#)^G; [Zhu, R.](#)^G; [Khong, C.](#)^G; [Liu, Y.](#)^P; [Liang, M.](#); [Lu, X.](#); **Wang, Y.** “Exploring the Cancer-Suppressive M1 Macrophage-Derived Small Extracellular Vesicles and Their Synergistic Potential as Drug Carriers” Biomedical Engineering Society (BMES) Annual Meeting, Oct 2025, San Diego, CA
22. [Kim, G.](#)^G; [Zhu, R.](#)^G; [Yu, S.](#); [Fan, B.](#); [Jeon, H.](#)^G; [Leon, J.](#)^U; [Webber, M.J.](#); **Wang, Y.** “Chiral-Assisted siRNA Loading and pH-Responsive Small Extracellular Vesicles for Highly Efficient Gene Delivery in Breast Cancer” Indiana University Melvin and Bren Simon Comprehensive Cancer Center Annual Cancer Research Day, May 2025, Indianapolis, IN

23. [Kim, G.](#); [Zhu, R.](#); [Yu, S.](#); [Fan, B.](#); [Jeon, H.](#); [Leon, J.](#); [Webber, M.J.](#); **Wang, Y.** "Empowering Gene Delivery to Breast Cancer: Small Extracellular Vesicles with Chiral-Assisted siRNA Loading and pH-Responsive Peptide Functionalization" Harper Cancer Research Institute's 13th annual Cancer Research Day, Apr 2025, Notre Dame, IN
24. [Kim, G.](#); [Zhu, R.](#); [Yu, S.](#); [Fan, B.](#); [Jeon, H.](#); [Leon, J.](#); [Webber, M.J.](#); **Wang, Y.** "Chiral-Assisted siRNA Loading and pH-Responsive Peptide Functionalization in Small Extracellular Vesicles for Efficient Intracellular Delivery" 2025 SFB Annual Meeting, Apr 2025, Chicago, IL
25. [Jeon, H.](#); [Zhu, R.](#); [Kim, G.](#) and **Wang, Y.** "Chirality-Enhanced Transport and Drug Delivery of Graphene Nanocarriers to Tumor-like Cellular Spheroid." AIChE Annual Meeting 2024, October 2024, San Diego, CA.
26. [Jeon, H.](#) and **Wang, Y.** "Biomimetic Hydrogel-based Platform for Engineered Organoid Culture and High-Content Drug Testing." AIChE Annual Meeting 2024, October 2024, San Diego, CA
27. [Jeon, H.](#) and **Wang, Y.** "Bioinert Hydrogel Framework for Precision 3D Cell Cultures Enabling Automated High-Content and High-Throughput Drug Screening." 9th Annual Notre Dame-Purdue Soft Matter & Polymers Symposium, October 2024, Notre Dame, IN
28. [Jeon, H.](#) and **Wang, Y.** "Soft Matter-based Engineered High-yield Organoid Culture Platform for High-content High-throughput Drug Screening." Society for Biomaterials (SFB) 2024, September 2024, Cleveland, OH
29. [Kim, G.](#); [Zhu, R.](#); [Zhang, Y.](#); [Jeon, H.](#); [Shirinch, F.](#); **Wang, Y.** "Fluorescent Chiral Quantum Dots to Explore Origin-Dependent Exosome Uptake and Cargo Release." AIChE 2024, October 2024, San Diego, CA
30. [Kim, G.](#); [Zhu, R.](#); [Zhang, Y.](#); [Jeon, H.](#); [Shirinch, F.](#); **Wang, Y.** "Exploring Origin-Dependent Exosome Uptake and Cargo Release using Fluorescent Chiral Quantum Dots." Society for Biomaterials (SFB) 2024, September 2024, Cleveland, OH
31. [Kim, G.](#); [Zhu, R.](#); [Zhang, Y.](#); [Jeon, H.](#); [Shirinch, F.](#); **Wang, Y.** "Exosome Journey from Cellular Uptake to Cargo Release: Tracking with Chiral Nanoparticles." Biomedical Engineering Society (BMES) Annual Meeting 2024, October 2024, Baltimore, MD
32. [Kim, G.](#); [Zhu, R.](#); [Yu, S.](#); [Fan, B.](#); [Leon, J.](#); [Webber, M.J.](#); **Wang, Y.** "Small Extracellular Vesicle-Based Gene Delivery via Highly Efficient siRNA Loading and pH-Responsive Lysosomal Escape." 9th Notre Dame-Purdue Symposium on Soft Matter & Polymers, October 2024, Notre Dame, IN
33. [Kim, G.](#); [Zhu, R.](#); [Yu, S.](#); [Webber, M.J.](#); **Wang, Y.** "pH-Responsive Therapeutic Exosomes for Enhanced Delivery of Immunotherapeutic siRNA." Indiana University Simon Comprehensive Cancer Center Cancer Research Day, September 2024, Indianapolis, IN
34. [Kim, G.](#); [Zhu, R.](#); [Yu, S.](#); [Webber, M.J.](#); **Wang, Y.** "Enhancing siRNA Delivery for Breast Cancer with pH-Sensitive Peptide-Functionalized Exosomes." Amelia Project Annual Meeting 2024, March 2024, Kokomo, IN
35. [Kim, G.](#); [Zhu, R.](#); [Jeon, H.](#); **Wang, Y.** "Unraveling Origin-dependent Exosome Uptake and Cargo Release Using Chiral Graphene Quantum Dots." Division of Biochemical Technology, ACS Spring 2024, March 2024, New Orleans, LA
36. [Johnston, J.](#); [Jeon, H.](#); **Wang, Y.** "Stimulative Piezoelectric Scaffold (PES) for Enhancing the Biogenesis of Small Extracellular Vesicles." AIChE Annual Meeting 2024, October 2024, San Diego, CA.

37. Jeon, H.^G; Wang, Y. "Soft Matter-based Platform for High-yield and High-throughput Engineered Organoid Culture." Division of Biochemical Technology, ACS Spring 2024, March 2024, New Orleans, LA
38. Jeon, H.^G; Zhu, R.^G; Kim, G.^G; Wang, Y. "Chirality-Driven Enhanced Uptake, Transport, and Drug Delivery of Graphene Quantum Dots (GQDs) into Cancerous Cellular Spheroids." AIChE Annual Meeting 2023, November 2023, Orlando, FL
39. Zhang, Y.^P; Wang, C.; Duong, L.; Zhu, Y.; Kim, G.^G; Zhu, R.^G; Lu, X.; Chang, H. C. and Wang, Y. "Chirality-Assisted Drug Delivery in Exosomes for Gene Therapy." AICHE Annual Meeting 2022, November 2022, Phenix, AZ
40. Zhu, R.^G; Rajewski, B.; Makwana, K.; Zhang, Y.^P; O'Keefe, M.^U; Del Valle, J. and Wang, Y. "Graphene Quantum Dots Prevent the Amyloidogenic Tau Protein Aggregation in Alzheimer's Disease." AICHE Annual Meeting 2022, November 2022, Phenix, AZ
41. Stone, T.^U and Wang, Y. "Graphene Quantum Dots: A New Antibiofilm Agent." AICHE Annual Meeting 2021, November 2021, *Virtual*
42. Zhu, R.^G and Wang, Y. "Self-Assembly of Biofilm Amyloids and Graphene Quantum Dots Under Shear Forces." AICHE Annual Meeting 2021, November 2021, *Virtual*

Prior to University of Notre Dame

1. Wang, Y.; Kadiyala, U.; Qu, Z.; Elvati, P.; Altheim, C.; Kotov, N.A.; Violi, A.; VanEpps, J.S. "Anti-biofilm Activity of Nanoparticles vis Assembly with Bacterial Amyloid Protein." ACS Fall 2019, August 2019, San Diego, CA
2. Liu, C.; Elvati, P.; Wang, Y.; Violi A. "General Model for the Permeation of Nanoparticles Through Cellular Membranes." ACS Fall 2019, August 2019, San Diego, CA
3. Elvati, P.; Liu, C.; Wang, Y.; Violi A. "Dynamics of Cellular Membranes and Their Interactions with Nanomaterials." ACS Fall 2019, August 2019, San Diego, CA
4. Wang, Y.; Kadiyala, U.; Qu, Z.; Elvati, P.; Altheim, C.; Kotov, N.A.; Violi, A.; VanEpps, J.S. "Anti-biofilm Activity of Graphene Quantum Dots via Self-Assembly with Bacterial Amyloid Proteins." MRS Fall 2018. November 2018. Boston, MA
5. Wang, Y.; Elvati, P.; Violi, A.; VanEpps, J.S. "Self-Assembly of Bacterial Peptides in a Staphylococcus aureus Biofilm: a Molecular Dynamics Study." 8th ASM Conference on Biofilms. October 2018. Washington D. C.
6. Wang, Y.; Kadiyala, U.; Qu, Z.; Elvati, P.; Altheim, C.; Kotov, N.A.; Violi, A.; VanEpps, J.S. "Graphene Quantum Dots Destabilize Amyloid Fiber Structures of Methicillin Resistant Staphylococcus aureus Biofilm." 2nd Annual William G. Barsan Emergency Medicine Research Forum. April 2017. Ann Arbor, MI
7. Wang, Y.; Bahng, J.; Kotov, N.A. "Fast Diffusion of Targeted Carbon Nanotubes in Cellular Spheroids." BMES Annual Meeting 2015. October 2015. Tampa, FL
8. Wang, Y.; Bahng, J.; Kotov, N.A. "Anomalous Diffusion of Targeted Carbon Nanotubes in Cellular Spheroids." Discovery on Target Conference. September 2015. Boston, MA

9. **Wang, Y.** and Kotov, N.A. Hepatic Differentiation of Controlled-Size Embryonic Bodies Derived by "Inverted Colloidal Crystal Scaffolds." CHE Graduate Symposium, University of Michigan. September 2015. Ann Arbor, MI
10. **Wang, Y.**; Bahng, J.; Kotov, N.A. "Anomalous Fast Diffusion of Nanoparticles in Cellular Spheroids." MRS Spring 2015, April 2015. San Francisco, CA
11. **Wang, Y.**; Bahng, J.; Kotov, N.A. "Anomalous Fast Diffusion of Carbon Nanotubes Carriers in 3D Tissue Model." AAPM. July 2014. Austin, TX
12. **Wang, Y.** and Kotov, N.A. "Anomalous Diffusion of Carbon Nanotubes in 3D Tissue Models." MRS Fall. November 2012. Boston, MA

FUNDING

University of Notre Dame Affiliation, external funding

Current

1. Advanced Research Projects Agency for Health (ARPA-H) 2026-2029 \$1,632,297.00 (\$45,442 to Wang)
TRANSFORM-L: Transforming Lymphatic Disease and Management: From Filariasis to Chronic Conditions
PI: Donny Hanjaya-Putra
Co-PIs: **Yichun Wang**, Meenal Datta, Hsueh-Chia Chang
2. National Science Foundation (NSF) CAREER 2024-2029 \$549,671
CAREER: Engineering Chiral Nanoscale Interactions to Enhance Nanomaterial Transport and Uptake in Tissue and at Biointerfaces
PI: **Yichun Wang** (*no collaborators or sub-contracts*)
3. National Institutes of Health (NIH) NIGMS-MIRA 2023-2028 \$1,916,700
A Convergent Bioengineered Platform for Multifunctional Therapeutic Exosomes
PI: **Yichun Wang** (*no collaborators or sub-contracts*)
4. National Institutes of Health (NIH) 2023-2026 \$401,375 (\$241,442 to **Wang**, total amount \$401,375 is all used for co-advised students by PI and co-I, as well as shared project resources)
A Scalable Continuous Production Platform for Large-Scale Manufacturing of Therapeutic Exosomes
PI: **Yichun Wang**
Co-I: Hsueh-Chia Chang

Completed

5. National Science Foundation (NSF) 2023-2025 \$416,980 (*Unpaid effort, mentored 4 REU students through the program*)
REU Site: Soft Materials for Applications in Sustainability and Healthcare Engineering
PI: William Phillip (**Wang**, Senior Personnel)
6. Department of Education 2021-2024 \$914,160 (~\$152,402 to **Wang**)
GAANN: Materials Engineering to Realize Innovative Technologies for Sustainability (MERITS)
Fellow Development Program
PI: Jennifer Schaefer (**Wang**, co-I)

7. NSF Industry-University Cooperative Research Center 2023-2024 \$50,000 (\$25,000 to **Wang**)
A High-Throughput Gel Droplet Organoid Drug Screening Platform
PI: Hsueh-Chia Chang (PI)
Co-Is: **Yichun Wang**, Satyajyoti Senapati and Donny Hanjaya-Putra
8. NSF Industry-University Cooperative Research Center 2022 \$75,000 (\$37,500 to **Wang**)
Smart Miniature Cell Culture Platform with PAT for Suspension Cells
PI: **Yichun Wang**
Co-I: Nosang Myung
9. American Cancer Society Institutional Research Grant 2021 \$30,000
Multiscale Drug Transport in Liver Cancerous Solid Tumor
PI: **Yichun Wang** (*no collaborators or sub-contracts*)

University of Notre Dame Affiliation, internal funding

Current

10. ND Sensor Initiative Seed Funding Award 2025-2026 \$44,952
A Portable Supramolecular–Quantum Dot Fluorescent Sensor Device for Rapid, Point-of-Use Forensic Screening of Fentanyl Analogs
PI: **Yichun Wang**
Co-I: Thomas O'Sullivan
11. Berthiaume Institute for Precision Health Technology Initiator Fund 2026-2027 \$40,000 (\$30,000 to **Wang**)
Chiral Carbon Nanomaterials for Host-Sparing, Broad-Spectrum Viral Envelope Inactivation
PI: **Yichun Wang**
Co-I: Pilar Romeo, Yamil Colon
12. IDEA Center RCG Fund 2026-2027 \$ \$83,182 (\$78,000 to **Wang**)
Stimulative piezoelectric nanofibrous scaffolds for enhanced extracellular vesicle production in 3D cultures
PI: **Yichun Wang**
Co-I: Robert Raffai
13. Berthiaume Institute for Precision Health Technology Bridge Fund 2026-2027 \$10,000
Advanced 3D iCC Hydrogel Platforms for Modeling Prostate Cancer Bone Metastasis
PI: **Yichun Wang**
Co-I: Xin Lu

Completed

14. Berthiaume Institute for Precision Health Technology Development Fund 2024-2025 \$30,000 (\$15,000 to **Wang**)
Machine Learning for Rapid Drug Screening
PI: Yamil Colon
Co-I: **Yichun Wang**
15. Berthiaume Institute for Precision Health Technology Development Fund 2024-2025 \$20,000
A 3D system that Mimics the Structure and Function of the Human Liver (\$10,000 to **Wang**)
PI: **Yichun Wang**
Co-I: Kaiyu Fu
16. Berthiaume Institute for Precision Health Discovery Fund 2022-2024 \$45,000 (\$35,000 to **Wang**)
A High-throughput and High Efficiency Platform for Therapeutic Exosome Production and Evaluation

PI: **Yichun Wang**

Co-Is: Xin Lu and Satyajyoti Senapat

17. Berthiaume Institute for Precision Health Seed Fund 2023-2024 \$10,000 (\$8,000 to **Wang**)
Supramolecular Capture & Sensing of Fentanyl-Class Agents with N-Doped Graphene Quantum Dots

PI: **Yichun Wang**

Co-I: Matthew J. Webber

18. STIR Grant, Notre Dame College of Science and College of Engineering 2023-2025 \$200,000 (\$150,000 to **Wang**)

Reprogramming the Tumor Immune Microenvironment (TIME) against Cancer with Smart Combinatorial Therapeutic Exosomes

PI: **Yichun Wang**

Co-Is: Hsueh-Chia Chang, Xin Lu, and Juan Del Valle

PATENTS AND DISCLOSURES

- **2022 Disclosure: Tech 23-028** New Provisional patent application filed - entitled "Chiral Graphene Quantum Dot Enhanced Drug Loading into Exosomes."
- **2023 Disclosure: Tech 24-047** New Provisional patent application filed - entitled "Stimulative Piezoelectric Nanofibrous Scaffolds for Enhanced EV Production in 3D Cultures."
- **2024 Disclosure: Tech 24-050** New Provisional patent application filed - entitled "Fluorometric Detection of Fentanyl-Class Agents through Integrated Supramolecular–Nanomaterial Device."
- **2024 PCT patent application has been filed on Tech 23-028**, COMPOSITIONS AND METHODS FOR ENHANCED DRUG LOADING INTO LIPID-BASED CARRIER
- **2025 PCT patent application has been filed on Tech 24-047**, STIMULATIVE PIEZOELECTRIC NANOFIBROUS SCAFFOLDS FOR ENHANCED EXTRACELLULAR VESICLE PRODUCTION IN 3D CULTURES.
- **2025 Disclosure: Tech 26-004** New Provisional patent application filed - entitled "A Chiral Nanoassembly Platform for Deep and Hypoxia-Resistant Cancer Photodynamic Therapy."

SERVICE & PROFESSIONAL ACTIVITIES

Chemical Engineering Department Service:

Graduate Admission Committee (2020-2024)

Graduate Recruiting (2021-2024)

Search Committee, Junior Faculty candidates (2024-2026)

Faculty Mentor for CBE Graduate and Postdoctoral Women's Group (2022-Present)

University Service:

Several internal proposal review panels: BELS, BIPH, Poverty Initiative and HCRI (2021-2026)

Interview committee for Director of Bioengineering & Life Sciences (BELS) (2024-2025)

Notre Dame Integrated Imaging Facility expansion to acquire new confocal microscope (2024)

President, Notre Dame Faculty and Staff Chinese Heritage Group (2026-Present)

College Council Committee Member for the College of Engineering (2026.1-2026.5)

Invited Grant Review

Collaboration in Translational Research (CTR) 2021

NIH Innovations in Nanosystems and Nanotechnology (INN) Review Panels 2023-2025 (3 *study sections/year*) *Ad Hoc*

NSF CBET Review Panel 2024-2025

NIH INDA Review Panel 2025

NIH INN Review Panels 2025-2029 *Standing Member, 3 study sections/year, 4-year term*

Peer Reviewer (>30/year) for journals such as

ACS Nano, ACS Biomaterials Science & Engineering, ACS Applied Polymer, ACS Applied Materials & Interfaces, ACS Applied Nano Materials, ACS Central Science, ACS Materials Letters, ACS Neuro Science, ACS Omega, Advanced Functional Materials, Analytical Chemistry, Biomedical Materials, Bioengineering & Translational Medicine, Cellular and Molecular Bioengineering, Chemical Engineering Journal, Expert Opinion on Drug Delivery, Lab on a Chip, Journal of Extracellular Vesicles, Molecular Therapy, Nanocomposites, Nanotechnology, Nano Letters, Nano Today, Nature Method, Nature Protocol, Nature Biofilms and Microbiomes, Science, Science Advances, Science Bulletin, Sensors and Actuators Reports, Small, Small Science, Transactions on Biomedical Engineering, Trends in Pharmaceutical Science

ECS Session Chair

B02 "Nanocarbons in plants & biomaterials" 245th ECS Meeting, San Francisco, CA, 2024

B02 "Nanocarbons in plants & biomaterials" 249th ECS Meeting, Seattle, WA, 2026

AIChE Session Chair

MDSE 8B "Biomaterials: Drug Delivery" AIChE Annual Meeting, Phenix, AZ, 2022

MDSE 8B "Biomaterials: Drug Delivery" AIChE Annual Meeting, Orlando, FL, 2023

MDSE 8B "Biomaterials: Drug Delivery and Immune Engineering" AIChE Annual Meeting, San Diego, CA, 2024

MDSE 8B "Area Plenary: Leaders in Biomaterials (Invited Talks)" AIChE Annual Meeting, Boston, MA, 2025

MDSE 8B "Tissue Engineering Biomaterials for Directing Cell Behavior" AIChE Annual Meeting, Boston, MA, 2025

MDSE 8F "Bio-inspired Composites" AIChE Annual Meeting, Boston, MA, 2025

MDSE 8F "Fibers and Coatings: 1D and 2D Composites" AIChE Annual Meeting, Boston, MA, 2025

NSEF "Honoring Dr. Nicholas Kotov: NAE election and 60th Birthday Celebration (Invited Talks)" AIChE Annual Meeting, Boston, MA, 2025

MDSE 8B "Structural Design of Biomaterials for Tissue Engineering", Minneapolis, MN, 2026

MDSE 8B "Tissue Engineering Biomaterials for Directing Cell Behavior" Minneapolis, MN, 2026

Notre Dame-Purdue Soft Matter & Polymers Symposium Co-Chair

7th Notre Dame-Purdue Soft Matter & Polymers Symposium, Notre Dame, IN, 2022

8th Notre Dame-Purdue Soft Matter & Polymers Symposium, Lafayette, IN, 2023

9th Notre Dame-Purdue Soft Matter & Polymers Symposium, Notre Dame, IN, 2024

10th Notre Dame-Purdue Soft Matter & Polymers Symposium, Lafayette, IN, 2025

11th Notre Dame-Purdue Soft Matter & Polymers Symposium, Notre Dame, IN, 2026

Editorial Service

Editor, Chemical Engineering Journal, Elsevier (IF= 13.200) 2026-

Guest Editor, Frontiers in Molecular Biosciences: Topic Machine Learning Assisted Biomolecular Discovery and Analysis for Next Generation Biosensing and Biomedicine 2021

Guest Editor, Frontiers in Nanotechnology: Topic Multifunctional Nanomaterials for Biosensors and Therapeutics 2020

Teaching and Outreach Activities

Developer, "Nano in Life" hands-on learning module at Robinson Community Learning Center, September 2022

Developer, "Nano in Life" hands-on learning module at Robinson Community Learning Center, June 2023-2024

Attendee, ASEE Summer School for Chemical Engineering Faculty, July 2022

Attendee, NETI-3E: A Workshop by National Effective Teaching, June 2021

PROFESSIONAL ASSOCIATIONS

2012-Present	Member, Materials Research Society (MRS)
2015-Present	Member, Biomedical Engineering Society (BMES)
2015-Present	Member, American Chemical Society (ACS)
2018-Present	Member, American Society for Microbiology (ASM)
2020-Present	Member, American Institute of Chemical Engineers (AIChE)
2024-Present	Member, Electrochemical Society (ECS)

TEACHING AND ADVISING

University of Notre Dame Affiliation

Classroom Teaching

- CBE 40731/60731 "Nanomedicine: Therapeutics and Diagnostics" (senior and graduate level)
Content & Curriculum: New elective course I designed for upper level undergraduate and graduate students. The course focuses on understanding the central role of nanotechnology in the development of new therapeutic and diagnostic tools that can be used for the detection, imaging, and treatment of different diseases. In this course, I review the basic knowledge and engineering principles of nanomedicine ranging from fundamental properties, synthesis, and characterization of nanomaterials to the laws revolving around molecular and particulate transport, sorting, and binding. Based on this foundation, I discuss with the students through reading assignments and research projects: 1) specific examples of nanotechnology applications in therapeutics such as drug and vaccine delivery, 2) formulation of nanostructured devices and their application in diagnostic and imaging, and 3) translation from concept to the clinic and commercialization.

Enrollment Information:
 - Fall 2021: 3 graduate students
 - Fall 2022: 18 undergraduate students, 7 graduate students
 - Fall 2023: 13 undergraduate students, 4 graduate students
 - Fall 2025: 1 undergraduate students, 11 graduate students
- CBE 30386 "Introduction to Bioengineering" (junior and senior level)
Content & Curriculum: The foundational course for the Minor in Bioengineering, open to all majors in the College of Engineering and the College of Science. This course provides basic science knowledge and engineering practices used by bioengineers toward solving problems in human health. Topics include an overview of modern quantitative biology, including an introduction to cell, molecular, and genetic engineering principles. An emphasis is placed on engineering analysis to describe living systems, including mass and energy balances to understand cell growth and signal transduction.

Enrollment Information:
 - Spring 2021: 37 undergraduate students
 - Spring 2022: 21 undergraduate students

- *Spring 2023*: 35 undergraduate students
 - *Spring 2024*: 27 undergraduate students
 - *Spring 2025*: 17 undergraduate students
 - *Spring 2026*: 26 undergraduate students
- CBE 30357 "Biotransport" (junior level)
Content & Curriculum: The term "Transport Phenomena" includes a broad range of phenomena including fluid mechanics, heat transfer and mass transfer. The mechanisms for all three involve molecular diffusion and convection. Thus, the governing equations for each share significant similarity. This course focuses on fluid mechanics. Example problems and physical phenomena will be chosen from medically and biologically relevant processes. Topics include the fundamentals of fluid motion and stress in fluids at the microscale, the differential equations of fluid flow, solutions of differential equations, limiting behavior such as "creeping flow," lubrication flow and boundary layer flows, the Bernoulli equation, and the integral momentum formulation.

Enrollment Information:
- *Fall 2026*: 55 undergraduate students
 - CBE 20225 "Introduction to Chemical Engineering Analysis" (sophomore level)
Content & Curriculum: The first class in the chemical engineering sequence, covering engineering calculations, mass and energy balances, reactions, and phase equilibrium as well as introducing chemical systems, processes, and unit operations.

Enrollment Information:
- *Fall 2020*: 27 undergraduate students

MENTORSHIP ACTIVITIES

University of Notre Dame Affiliation

Post-doctoral Scholars

Dr. Youwen Zhang, Post-doctoral Scholar, 08/2021-02/2023
Dr. Mona Saadeldin, Post-doctoral Scholar, 12/2022-09/2023
Dr. Yanjing Gao, Post-doctoral Scholar, 05/2023-09/2024
Dr. Wei Zhang, Post-doctoral Scholar, 01/2025-03/2026
Dr. Yichen Liu, Post-doctoral Scholar, 09/2024-present
Dr. Honglin Huang, Post-doctoral Scholar, 11/2025-present

Graduate Students

Runyao Zhu, Chemical and Biomolecular Engineering (*defended* PhD 2025)
Courtney Khong, Chemical and Biomolecular Engineering (*defended* MS 2025)
Gaeun Kim, Chemical and Biomolecular Engineering (*defended* PhD 2026)
Hyunsu Jeon, Chemical and Biomolecular Engineering (anticipated 2026)
James Johnston, Chemical and Biomolecular Engineering (anticipated 2026)
Farbod Shirinchi, Chemical and Biomolecular Engineering (anticipated 2028)
Tiago Thomaz Migliati Zanon, Chemical and Biomolecular Engineering (anticipated 2028)
Huo Yao, Chemical and Biomolecular Engineering (anticipated 2029)
Alan Arizmendi Almaraz, Chemical and Biomolecular Engineering (anticipated 2029)
Patrick McKenzie, Chemical and Biomolecular Engineering (anticipated 2030)

Undergraduate Students

Trevor Stone Jr., Chemical Engineering (Fall 2021, Fall 2022, Spring 2023)

Erica Lim, Chemical Engineering (Summer 2021)
Daniel Hernandez, Chemical Engineering (Spring/Summer/Fall 2022, Spring 2023)
Meghan O'Keefe, Chemical Engineering (Spring/Summer 2022)
Elias Issa, Biochemistry (Fall 2022, Spring 2023)
Maddie Laude, Chemical Engineering (Spring/Fall 2023)
Kate P. Chouinard, Chemical Engineering (Fall 2024)
Daisy Santos, Chemical Engineering (Spring 2024)
Ryan Nguyen, Chemical Engineering (Spring/Fall 2024)
Timothy Cain, Chemical Engineering (Spring 2024, Spring 2025)
David Fisher, Chemical Engineering (Fall 2023, Spring/Fall 2024, Spring/Summer 2025)
Mara Gurtsak, Chemical Engineering (Fall 2023, Spring/Fall 2024, Spring 2025)
Lauren McCarthy, Chemical Engineering (Fall 2023, Spring 2024, Spring/Fall 2025)
Jennifer Leon, Chemical Engineering (Fall 2023, Spring/Fall 2024, Spring/Fall 2025)
Matthew J. Tecson, Chemical Engineering (Fall 2024, Spring/Fall 2025)
Paityn Krout, NSF REU SMASH summer research (Summer 2023)
Kamilah Richardson, NSF REU SMASH summer research (Summer 2024)
Swindar Zhou, NDnano Scholar (Summer 2024)
Angie Montero, NSF REU/HCRI summer research (Summer 2025)
Victor Lazkani, NDnano Scholar (Summer 2025)
Simran Khatri, Naughton Fellow (Summer 2025)
Mae-Lin Pinkstaff (Fall 2024, Spring/Fall 2025, Spring 2026)
Braeden J. Smith, Chemical Engineering (Fall 2024, Spring 2025, Spring 2026)
Claire K. Mangan, Chemical Engineering (Fall 2024, Spring/Fall 2025, Spring 2026)
Aliciana Ilias, NSF REU/HCRI summer research (Summer/Fall 2024, 2025, Spring 2026)
Martin Nunez, Holy Cross College (Spring/Summer 2026)
Giovanna Suwita, Chemical Engineering (Summer 2026)

Visiting Scholar

Dr. Seung Jun Lee, Gyeongsang National University (2022-2023)

High School Students

Zachary Roeder, Trinity High School (Fall 2021, Spring 2022)
Genevieve Linczer, Trinity High School (Fall 2022, Spring 2023)
Martin Nunez, RC3 Scholar, Marian High School (Summer/Fall 2024, Spring/Summer 2025)
Teagan Rucker, RC3 Scholar, Gonzaga Preparatory School (Summer 2025)
Leena Khan, Penn High School (Summer 2026)
Ella Rich, RC3 Scholar, Saint George's School in Spokane (Summer 2026)
Car'ess Phillips, RC3 Scholar, Washington High School (Summer 2026)

University of Michigan Affiliation**Research Mentor to Junior Graduate Students**

Mische Hubbard, Chemical Engineering, 2017-2019

Research Mentor to Undergraduate Students

Babak Mahjour, Chemical Engineering, 2014-2016

- *Med chem PhD student umich*

Emily Lin, Chemical Engineering, 2014-2015

Charles Machi, Chemical Engineering, 2011-2013

- *Co-authored paper in Small 2013*

Carly Chorba, Chemical Engineering, 2012

THESIS COMMITTEES

PhD Thesis Committees:

Bingxin Yang, Chemical and Biomolecular Engineering (2023)
Sonu Kumar, Chemical and Biomolecular Engineering (2024)
Sihan Yu, Chemical and Biomolecular Engineering (2024)
Sijie Xian, Chemical and Biomolecular Engineering (2025)
Jiaying Ji, Aerospace and Mechanical Engineering (2025)
Runyao Zhu, Chemical and Biomolecular Engineering (2025)
Gyoyeon Hwang, Chemical and Biomolecular Engineering (2025)
Emily Bromley, Chemical and Biomolecular Engineering (2026)
Gaeun Kim, Chemical and Biomolecular Engineering (2026)
Donping Liu, Chemical and Biomolecular Engineering (2026)
Daniel Montes Pinzon, Chemical and Biomolecular Engineering (2026)
Tiger Shi, Chemical and Biomolecular Engineering (2026)
Yiwei Su, Chemical and Biomolecular Engineering (2026)

Master Thesis Committees:

Braton Gate, Chemical and Biomolecular Engineering (2022)
Courtney Khong, Chemical and Biomolecular Engineering (2025)

Bachelor Thesis Committees:

Grace Gasper, Chemical and Biomolecular Engineering (2022)
Christian Gabriel El Azar, Chemical and Biomolecular Engineering (2025)
Aliciana Ilias, Neuroscience at the St. Mary College (2026)