Penn School of Engineering
Department of Chemical and Biomolecular Engineering
Xue (Sherry) Gao, Associate Professor

Jan. 30th, 2024

Dear BMES CMBE Special Interest Group Council Members,

I am writing to express my enthusiasm and interest in serving on the BMES Cellular and Molecular Bioengineering (CMBE) Special Interest Group Council. As a dedicated member of the biomedical engineering community, I am deeply committed to advancing the field of cellular and molecular bioengineering through collaboration, innovation, and education.

Throughout my academic and professional journey, I have cultivated a strong passion for the interdisciplinary nature of bioengineering, particularly in the cellular and molecular realms. My educational background in Protein and Genome Engineering has equipped me with a solid foundation in both theoretical knowledge and practical skills essential for addressing complex challenges in cellular and molecular bioengineering.

Moreover, my independent career in the past 6 years at the interface of Bioengineering, Chemistry, and Chemical Biology has provided me with valuable insights into the current trends, emerging technologies, and pressing issues of Precision Engineering for human health. I have actively contributed to developing therapeutic biomolecules that aim to translate cutting-edge research into tangible solutions with real-world impact.

If selected to serve on the BMES CMBE Special Interest Group Council, I am eager to collaborate with fellow members to foster a vibrant and inclusive community dedicated to advancing cellular and molecular bioengineering. I am committed to leveraging my skills, experiences, and passion to support the goals and initiatives of the council, whether it involves organizing events, facilitating discussions, or advocating for the needs of our members.

In addition, I have served as the Secretary AIChE Division 15 Executive Committee and the Treasurer for the Society of Chinese Bioscientists in America-TX in the past years. I believe that by working together, we can drive meaningful progress, promote interdisciplinary collaboration, and empower the next generation of bioengineers to tackle the grand challenges facing humanity.

Thank you for considering my application. I am excited about the opportunity to contribute to the BMES CMBE Special Interest Group Council and help shape the future of cellular and molecular bioengineering.

Sincerely,

Xue (Sherry) Gao
Associate Professor, Chemical and Biomolecular Engineering
The University of Pennsylvania

Xue (Sherry) Gao, Ph.D.
Email: xuegao@seas.upenn.edu

PROFESSIONAL APPOINTMENT

Associate Professor,
University of Pennsylvania — Philadelphia, PA, USA

Department of Chemical and Biomolecular Engineering — 2024 - Present

Center of Precision Engineering for Health — 2024 - Present

Ted N. Law Assistant Professor, Rice University — Houston, TX, USA

Department of Chemical and Biomolecular Engineering — 2017 to 2023

Department of BioEngineering — 2018 to 2023

Department of Chemistry — 2020 to 2023

Postdoctoral Fellow, Harvard University — Cambridge, MA, USA

Department of Chemistry and Chemical Biology, Cambridge, MA, USA — 2013 to 2017

Advisor: David R. Liu

EDUCATION

Ph.D. Chemical and Biomolecular Engineering, UC Los Angeles — 2007 to 2013

Thesis title: *Investigation, Characterization, and Engineering of Fungal Natural Product Biosynthesis*

Advisor: Yi Tang

M.S. Pharmaceutical Engineering, Tianjin University — 2005 to 2007

Advisor: Yingjin Yuan

B.S. Pharmaceutical Engineering, Tianjin University — 2001 to 2005

AWARDS and HONORS

BMES Cellular and Molecular Bioengineering (CMBE) Rising Star Awardee — 2024

NSF CAREER Award — 2022-2027

Invitee to US-China Frontiers of Engineering Symposium, National Academy of Engineering — 2022

The Outstanding Young Faculty Award at Rice School of Engineering — 2022

NIH Maximizing Investigators' Research Award — 2020-2025

Welch Foundation Research Award — 2018-2024

Hamill Innovation Award (Rice) — 2018

InterDisciplinary Excellence Award (Rice) — 2018

ACS Dan Su Travel Award (Harvard) — 2014

UCLA Dissertation Year Fellowship — 2012

Harry M. Showman Prize at UCLA (given to One Ph.D. student each year) — 2012

Presidential Green Chemistry Challenge Award from EPA (UCLA) — 2012

AIChE Women in Chemical Engineering Travel Grant Award (UCLA) 2012
Procter & Gamble Seminar Competition Award (UCLA) 2012

PUBLICATIONS

(Citations 4321; h-index 24) †*denotes equal contribution*; **denotes the corresponding author.*
https://scholar.google.com/citations?user=uuc4jzoAAAAJ&hl=en

Publication at Rice University

1. Zeng HZ, Yuan QC†, Peng F†, Ma, DC†, Lingineni A, Chee K, Gilberd P, Osikpa EC, Sun Z*, **Gao X***. A split and inducible adenine base editor for precise in vivo base editing. *Nature Communications*. **2023,** 14:5573.
2. Deng, XY†, Osikpa, EC†, Yang, J, Smith, J, **Gao, X*** Gao, Y*. Structural Basis of a Compact CRISPR-Cas13 Nuclease Activation. *Nature Communications*. **2023,** 14:5845.
3. Daniel TC, Zeng HZ, Osikpa EC, **Gao X***. Revolutionizing Genetic Disease Treatment Recent Technological Advances in Base Editing. *Current Opinion in Biomedical Engineering.* **2023**, *in press*.
4. Hajikhani M, Zhang Y, **Gao X**, Lin MS*. Advances in CRISPR-based SERS detection of food contaminants: A review. *Trends in Food Science & Technology.* **2023**, 138:615-627.
5. Zhang Y, Song Y, Weng Z, Yang J, Avery L, Dieckhaus KD, Lai RY, **Gao X**, Zhang Y*. A point-of-care microfluidic biosensing system for rapid and ultrasensitive nucleic acid detection from clinical samples. *Lab on a Chip.* **2023**, 23(17):3862-3873.
6. Liu S†, Nie QY†, Liu ZW, Patil S, **Gao X***. A fungal P450 deconstructs the 2,5-diazabicyclo[2.2.2]octane ring en route to the complete biosynthesis of 21*R*-citrinadin A. *Journal of the American Chemical Society.* **2023**, 145(26):14251-14259.
7. Weng Z†, You Z†, Li H, Wu G, Song Y, Sun H, Fradlin A, Neal-Harris C, Lin M, **Gao X*** Zhang Y*. CRISPR-Cas12a Biosensor Array for Ultrasensitive Detection of Unamplified DNA with Single-Nucleotide Polymorphic Discrimination. *ACS Sensors.* **2023**, 8(4):1489-1499.
8. Weng ZY†, Zheng Y†, Yang J, Noor M, Lin MS, Wei QS, **Gao X*** Zhang Y*. CRISPR-Cas Biochemistry and CRISPR-Based Molecular Diagnostics. *Angewandte Chemie International Edition*. **2023**, 62(17):e202214987.
9. Liu Z†, Rivera S†, Newmister SA†, Sanders J†, Zhao FL, Ferrara J, Nie QY, Shi H, Patil S, Xu W, Miller M, Phillips Jr GN, Houk KN*, Sherman DH*, **Gao X***. An NmrA-like enzyme-catalysed redox-mediated Diels-Alder cycloaddition with anti-selectivity. *Nature Chemistry.* **2023**, 15(4):526-534.
10. Ma DC†, Yuan QC†, Peng F†, Paredes V, Zeng HZ, Yang QC, Peddi A, Patel A, Liu MS, Sun Z*, **Gao X*** Engineered PROTAC-CID systems for mammalian inducible gene regulation. *Journal of the American Chemical Society*. **2023**, 145(3):1593-1606.
11. Zhao FL†, Sun CX†, Liu ZW, Cabrera A, Escobar M, Huang SY, Yuan QC, Nie QY, Lee Luo K, Lin A, Vanegas JA, Zhu T, Hilton IB, **Gao, X.*** Multiplex base-editing enables combinatorial epigenetic regulation for genome mining of fungal natural products. *Journal of the American Chemical Society.* **2023**, 145 (1), 413-421.
12. Yang J †, Song Y †, Xiang D, Vanegas JA, You Z, Zhang YX, Weng Z, Avery L, Dieckhaus KD, Peddi A, Gao Y*, Zhang Y*, and **Gao X***. Engineered LwaCas13a with enhanced collateral activity for nucleic acid detection. *Nature Chemical Biology.* **2023**. 19(1):45-54.
13. Nie QY, Guo S, **Gao X***. Unraveling the biosynthesis of penicillenols by genome mining polyketide synthase and nonribosomal peptide synthetase gene clusters in *Penicillium citrinum*. *AICHE Journal.* **2022**, 68(11):e17885.

14. Yuan Q, **Gao X***. Multiplex base- and prime-editing with drive-and-process CRISPR arrays. *Nature Communications.* **2022**,13(1): 2771.

15. Li H, Yang J, Wu G, Weng Z, Song Y, Zhang Y, Vanegas JA, Avery L, Gao Z, Sun H, Chen Y, Dieckhaus KD, **Gao X***, Zhang Y*. Amplification-free detection of SARS-CoV-2 and respiratory syncytial virus using CRISPR Cas13a and graphene field-effect transistors. *Angewandte Chemie International Edition.* **2022**, 61: e202203826.

16. Fu R, He W, Dou J, Villarreal OD, Bedford E, Wang H, Hou C, Zhang L, Wang Y, Ma D, Chen Y, **Gao X**, Depken M, Xu H. Systematic decomposition of sequence determinants governing CRISPR/Cas9 specificity. *Nature Communications.* **2022**, 13(1):474.

17. Wang Q, Yang J, Zhong Z, Vanegas JA, **Gao X***, Kolomeisky AB*. A general theoretical framework to design base editors with reduced bystander effects. *Nature Communications.* **2021**, 12(1): 6529.

18. Liu Z, Zhao F, Zhao B, Yang J, Ferrara J, Sankaran B, Venkataram Prasad BV, Kundu BB, Phillips GN Jr, Gao Y, Hu L, Zhu T*, **Gao X***. Structural basis of the stereoselective formation of the spirooxindole ring in the biosynthesis of citrinadins. *Nature Communications.* **2021**, 12(1): 4158.

19. Ding N, Lee S, Lieber-Kotz M, Yang J, **Gao X***. Advances in genome editing for genetic hearing loss. *Advanced Drug Delivery Reviews.* **2021**, 168:118-133.

20. Zhao F, Liu Z, Yang S, Ding N, **Gao X***. Quinolactacin biosynthesis involves non-ribosomal-peptidesynthetasecatalyzed Dieckmann condensation to form the quinolone-γ-lactam hybrid. *Angewandte Chemie International Edition.* **2020**, 59(43): 19108-19114.

21. Liu W, An C, Shu X, Meng X, Yao Y, Zhang J, Chen F, Xiang H, Yang S, **Gao X***, Gao SS*. A dual-plasmid CRISPR/Cas system for mycotoxin elimination in polykaryotic industrial fungi. *ACS Synthetic Biology.* **2020**, 21;9(8): 2087-2095.

22. Lee S, Ding N, Sun Y, Yuan T, Li J, Yuan Q, Liu L, Yang J, Wang Q, Kolomeisky AB, Hilton IB, Zuo E*, **Gao X***. Single C-to-T substitution using engineered APOBEC3G-nCas9 base editors with minimum genome- and transcriptome-wide off-target effects. *Science Advances.* **2020**, 6(29): eaba1773.

23. Wan T, Chen Y, Pan Q, Xu X, Kang Y, **Gao X**, Huang F, Wu C, Ping Y*. Genome editing of mutant KRAS through supramolecular polymer-mediated delivery of Cas9 ribonucleoprotein for colorectal cancer therapy. *Journal of Controlled Release.* **2020**, 322: 236-247.

24. Hu JH, Miller SM, Geurts MH, Tang W, Chen L, Sun N, Zeina CM, **Gao X**, Rees HA, Lin Z, Liu DR*. Evolved Cas9 variants with broad PAM compatibility and high DNA specificity. *Nature.* **2018**, 556(7699): 57-63.

25. **Gao X**, Tao Y, Lamas V, Huang M, Yeh WH, Pan B, Hu YJ, Hu JH, Thompson DB, Shu Y, Li Y, Wang H, Yang S, Xu Q, Polley DB, Liberman MC, Kong WJ, Holt JR, Chen ZY*, Liu DR*. Treatment of autosomal dominant hearing loss by *in vivo* delivery of genome editing agents. *Nature.* **2018**, 553(7687): 217-221.

Publication Prior to Rice University

1. Wang M, Zuris JA, Meng F, Rees H, Sun S, Deng P, Han Y, **Gao X**, Pouli D, Wu Q, Georgakoudi I, Liu DR, Xu Q. Efficient delivery of genome-editing proteins using bioreducible lipid nanoparticles. *Proceedings of the National Academy of Sciences of the United States of America.* **2016**, 113(11): 2868-2873.

2. Jiménez-Osés G†, Osuna S†, **Gao X†**, Sawaya MR, Gilson L, Collier SJ, Huisman GW, Yeates TO, Tang Y, Houk KN. The role of distant mutations and allosteric regulation on LovD active site dynamics. *Nature Chemical Biology.* **2014**, 10(6): 431-436.

3. **Gao X**, Jiang W, Jiménez-Osés G, Choi MS, Houk KN, Tang Y*, Walsh CT*. An iterative, bimodular nonribosomal peptide synthetase that converts anthranilate and tryptophan into tetracyclic asperlicins. *Chemistry & Biology.* **2013**, 20(7): 870-878.

4. Wang P, Bashiri G, **Gao X**, Sawaya MR, Tang Y*. Uncovering the enzymes that catalyze the final steps in oxytetracycline biosynthesis. *Journal of the American Chemical Society.* **2013**, 135(19): 7138-7141.

5. Haynes SW, **Gao X**, Tang Y*, Walsh CT*. Complexity generation in fungal peptidyl alkaloid biosynthesis: a two-enzyme pathway to the hexacyclic MDR export pump inhibitor ardeemin. *ACS Chemical Biology.* **2013**, 8(4): 741748.
6. Walsh CT*, Haynes SW, Ames BD, **Gao X**, Tang Y. Short pathways to complexity generation: fungal peptidyl alkaloid multicyclic scaffolds from anthranilate building blocks. *ACS Chemical Biology.* **2013**, 8(7): 1366-1382.
7. Wang P, Kim W, Pickens LB, **Gao X**, Tang Y. Heterologous expression and manipulation of three tetracycline biosynthetic pathways. *Angewandte Chemie International Edition.* **2012**, 51(44): 11136-11140.
8. Haynes SW, **Gao X**, Tang Y, Walsh CT. Assembly of asperlicin peptidyl alkaloids from anthranilate and tryptophan: a two-enzyme pathway generates heptacyclic scaffold complexity in asperlicin E. *Journal of the American Chemical Society.* **2012**, 134(42): 17444-17447.
9. **Gao X**, Haynes SW, Ames BD, Wang P, Vien LP, Walsh CT, Tang Y. Cyclization of fungal nonribosomal peptides by a terminal condensation-like domain. *Nature Chemical Biology.* **2012**, 8(10): 823-830.
10. Wang P, **Gao X**, Tang Y*. Complexity generation during natural product biosynthesis using redox enzymes. *Current Opinion in Chemical Biology.* **2012**, 16(3-4): 362-369.
11. Ames BD, Haynes SW, **Gao X**, Evans BS, Kelleher NL, Tang Y, Walsh CT. Complexity generation in fungal peptidyl alkaloid biosynthesis: oxidation of fumiquinazoline A to the heptacyclic hemiaminal fumiquinazoline C by the flavoenzyme Af12070 from Aspergillus fumigatus. *Biochemistry.* **2011**, 50(40): 8756-8769.
12. Wang P, **Gao X**, Chooi YH, Deng Z*, Tang Y*. Genetic characterization of enzymes involved in the priming steps of oxytetracycline biosynthesis in *Streptomyces rimosus*. *Microbiology*. **2011**, 157(Pt 8): 2401-2409.
13. Yang J, Yang S, **Gao X**, Yuan YJ*. Integrative investigation of lipidome and signal pathways in human endothelial cells under oxidative stress. *Molecular Biosystems.* **2011**, 7(8): 2428-2440.
14. Haynes SW, Ames BD, **Gao X**, Tang Y, Walsh CT*. Unraveling terminal C-domain-mediated condensation in fungal biosynthesis of imidazoindolone metabolites. *Biochemistry.* **2011**, 50(25): 5668-5679.
15. **Gao X**, Chooi YH, Ames BD, Wang P, Walsh CT, Tang Y. Fungal indole alkaloid biosynthesis: genetic and biochemical investigation of the tryptoquialanine pathway in *Penicillium aethiopicum*. *Journal of the American Chemical Society.* **2011**, 133(8): 2729-2741.
16. **Gao X**, Wang P, Tang Y*. Engineered polyketide biosynthesis and biocatalysis in *Escherichia coli*. *Applied Microbiology and Biotechnology.* **2010**, 88(6): 1233-1242. DOI: 10.1007/s00253-010-2860-4.
17. **Gao X**, Xie X, Pashkov I, Sawaya MR, Laidman J, Zhang W, Cacho R, Yeates TO*, Tang Y*. Directed evolution and structural characterization of a simvastatin synthase. *Chemistry & Biology.* **2009**, 16(10): 1064-1074.
18. Xie X, Pashkov I, **Gao X**, Guerrero JL, Yeates TO, Tang Y*. Rational improvement of simvastatin synthase solubility in Escherichia coli leads to higher whole-cell biocatalytic activity. *Biotechnology and Bioengineering.* **2009**, 102(1): 20-28.

PATENTS

1. Gao, X, Zeng, HZ. Split and inducible base editors for precise in vivo base editing. Provisional patent filed, **2023**.
2. **Gao, X**, Yuan, QC. Drive-and-process arrays for multiplex genome engineering. Provisional patent filed, **2022**.
3. **Gao, X**, Ma, D. PROTAC-CID systems for inducible gene regulations in mammalian cells, Provisional patent filed, **2022**.

4. **Gao, X**, Yang, J., and Gao, Y. Engineered Cas13 for ultrasensitive nucleic acid detection. Provisional patent filed (No. 63/285,304), **2022**.
5. **Gao, X**, Lee, S., and Ding, N. Single base editing tools with precise accuracy. US Patent App. 17/104,562, **2021.**
6. Tang, Y., **Gao, X**, Xie, X. LovD mutants exhibiting improved properties towards simvastatin synthesis. U.S. Patent No. 8,981,056 (Licensed), **2011**.

RESEARCH SUPPORT

ACTIVE

***Title: CRISPR-Cas13-based rapid HIV-1 test**
Major Goals: Develop a lateral flow CRISPR-Cas13 assay that will employ an engineered Cas13a enzyme with enhanced collateral activity and stability and offer a simplified workflow.
Project Number: 1R61AI167037-01A1
Role: **Co-investigator (Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 02/2023-01/2028
* Total Award Amount (including Indirect Costs): $485,860

***Title: CAREER: Develop PROTAC-CID, a Novel Small Molecule Inducible platform for Controllable Gene Expression in Mammalian Cells**
Major Goals: Develop novel inducible gene expression platforms in mammalian cells and enable a deep understanding of principles in gene expression and engineering in living cells.
Project Number: CBET - 2143626
Role: **PI (Gao, Xue)**
*Source of Support: NSF
Project/Proposal Start and End Date: 07/2022-06/2027
* Total Award Amount (including Indirect Costs): $502,071

***Title: Mechanistic study of the stereochemically controlled biosynthesis of fungal natural products**
Major Goals: Study how biosynthetic enzymes control the stereochemistry in fungal natural products.
Project Number: C1952
Role: **PI (Gao, Xue)**
*Source of Support: Welch Foundation
Project/Proposal Start and End Date: 06/2021-05/2024
* Total Award Amount (including Indirect Costs): $240,000

***Title: Develop High-Precision and Multiplex Base Editing Approaches for Therapeutic Applications**
Major Goals: Engineer new genome editing tools to be applied in genetic disease treatment, as exemplified by cystic fibrosis.
Project Number: 1R01HL157714
Role: **PI (Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 04/2021-03/2025
* Total Award Amount (including Indirect Costs): $2,048,893

***Title: Collaborative Research: CRISPR-SERS System for the Rapid and Ultrasensitive Detection of Foodborne Bacterial Pathogens**
Major Goals: Develop and optimize the CRISPR-Cas13 systems to create a new sensing mechanism that has the potential to achieve detection with single-copy sensitivity and single-base selectivity.
Project Number: CBET-2031242
Role: **PI (Gao, Xue)**
*Source of Support: NSF
Project/Proposal Start and End Date: 08/2020-07/2024

* Total Award Amount (including Indirect Costs): $149,999

***Title: Advancing CRISPR-Cas Technologies for the Discovery and Characterization of Novel Fungal Natural Products**
Major Goals: Develop new CRISPR tools for gene manipulation and novel natural product discovery in fungi.
Project Number: 1R35GM138207
Role: **PI (Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 06/2020-05/2025
* Total Award Amount (including Indirect Costs): $1,886,640

***Title: The Center for Innovation and Translation of Point of Care Technologies for Equitable Cancer Care**
Major Goals: Establish the Center for Innovation and Translation of Point-of-Care Technologies for Equitable Cancer Care (CITEC) to identify high-priority clinical needs for POC cancer technologies; to accelerate the development of effective, affordable technologies to meet these needs; to evaluate and improve the clinical and public health impact of POC technologies in diverse settings, and to train developers and users to create and disseminate more equitable POC technologies.
Project Number: PAR-22-203 (U54)
Role: **Co-investigator (Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 07/2023-06/2028
* Total Award Amount (including Indirect Costs): $10,716,260

PENDING

***Title: Chemically inducible split base editors for precise and controllable in vivo genome editing**
Major Goals: Develop the next-generation chemical controllable genome editing tools for effective treatment of genetic diseases.
Project Number: 1R01HL173243
Role: **Multi-PI (contact, Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 04/2024 - 03/2029
* Total Award Amount (including Indirect Costs): $2,451,285

***Title: Anatomic and molecular remodeling of a feeding circuit by metabolic, dietary and environmental cues**
Major Goals: Generate CRISPR-based knock-in vectors to tag GFP to endogenous neuronal receptors (5-HT2CR, DRD1, DRD2, and CRHR2) in neuronal cells.
Project Number: 1U01NS136403-01
Role: **Multi-PI (Gao, Xue)**
*Source of Support: NIH
Project/Proposal Start and End Date: 04/2024 - 03/2027
* Total Award Amount (including Indirect Costs): $7,970,058

***Overlap** (summarized for each individual): None

COMPLETED

Award Period	Role	Agency	Title	Award Amount to Gao

2018-2019	PI	Rice	Harnessing the Power of Metabolic Engineering for Unnatural Ribosomal Polypeptide Synthesis	$15,000
2018-2020	PI	Rice	Precise Control of the CRISPR-Cas System: from theory to experiment	$75,000
2018-2021	PI	Welch Foundation (C-1952)	The Next Generation of Ribosomal Natural Products from Microbiome	$208,500
2019-2022	Co-I	NIH (UG3HL151545)	Velcro AAV Vector for Tissue-specific Delivery of Genome Editing Reagents with Enhanced Cargo Capacity	$234,750

PROFESSIONAL ACTIVITIES

Rice University ChBE Graduate Student Admission Committee, **2017-present**

Rice ChBE Graduate Student Study Committee, **2017-present**

Rice ChBE Graduate Seminar Committee, **2019-present**

iScience Editorial Advisory Board, **2019-present**

Secretory AIChE Division 15 Executive Committee, **2021-present**

Training Interdisciplinary Pharmacology Scientists (TIPS) Steering Committee, **2022-present**

Section Chairs for AIChE 2022 Annual Meeting for Division 15, **2023**

Rice Chemistry Department Tenure Track Assistant Professor Search Committee, **2023**

Treasurer for the Society of Chinese Bioscientists in America-TX, **2022-2023**

NIH Panelist for Small Business: Cell and Molecular Biology Panel, **2022**

Section Chair for Synthetic Biology in Institute of Biological Engineering Annual Meeting, **2022**

Section Chair for the Biocatalysis Gordon Conference, **2022**

Section Chairs for AIChE 2022 Annual Meeting for Division 15, **2022**

NIH Panelist for Therapeutic Approaches to Genetic Diseases Study Section, **2021**

Rice ChBE Department Tenure Track Assistant Professor Search Committee, **2018**

PRESENTATIONS

1. Invited speaker, 5th International Conference on Base Editing, Prime Editing & Related Enzymes, San Diego, USA, 2024
2. Keynote speaker, Frontiers in Genome Editing, Goa, India, 2023
3. Invited seminar speaker, Center for Genome Engineering, University of Minnesota Medical School - Twin Cities, Minneapolis, USA, 2023
4. Invited seminar speaker, Keck seminar series, Gulf Coast Consortia, Houston, USA, 2023
5. Invited speaker, SIMB annual meeting, Minneapolis, USA, 2023
6. Invited speaker, CADA annual meeting, San Diego, USA, 2023
7. Invited speaker, The Canadian Society for Chemistry annual meeting, Vancouver, Canada, 2023
8. Invited seminar speaker, Center for Cardiovascular Regeneration, Cardiovascular Science Department, Houston Methodist Research Institute, USA, 2023
9. Invited speaker, 36th SCBA-TX symposium, Houston, USA, 2023
10. Invited seminar speaker, Huffington Center on Aging, Baylor College of Medicine, USA, 2023
11. Invited speaker, Department of Chemical and Environmental Engineering, University of California, Riverside, USA, 2023.

12. Invited seminar speaker, Department of Chemical and Biomolecular Engineering, University of Pennsylvania, USA, 2023.
13. Invited seminar speaker, Department of Ophthalmology, University of California, Irvine, USA, 2023.
14. Invited speaker, 4th International Conference on Base Editing Enzymes and Applications, Palm Spring, USA, 2023.
15. Invited speaker, 12th International Conference on Biomolecular Engineering, Santa Barbara, USA, 2023.
16. Invited speaker, Department of Chemistry, University of California, Santa Barbara, USA, 2023.
17. Invited speaker, 2nd Winter In-Person Organic Symposium, Honolulu, Hawaii, USA, 2022.
18. Invited speaker, Department of Chemical Engineering, Stanford University, USA, 2022.
19. Keynote speaker, 5th annual CRISPR event, virtual, USA, 2022.
20. Invited speaker, 5th international conference on CRISPR technologies, University of California, Berkeley, USA, 2022.
21. Invited speaker, Department of Chemistry, Johns Hopkins University, USA, 2022.
22. Invited speaker, Department of Chemical and Biomolecular Engineering, University of Houston, USA, 2022.
23. Invited speaker, Virtual seminar to our materials and human science researchers at the US Army DEVCOM Soldier Center, USA, 2022
24. Invited speaker, Advances in Biotechnology, Northwestern University, USA, 2022 13. Invited speaker, Institute of Biological Engineering Annual Meeting, Athens, USA, 2022
25. Speaker, AIChE annual meeting, Boston, USA, 2021.
26. Invited speaker, American Society for Microbiology (ASM)'s monthly MicroTalks, Houston, USA, 2021.
27. Invited speaker, Baylor College of Medicine, Houston, USA, 2021.
28. Invited speaker, SCBA-TX Faculty Club Seminar, 2021, Houston, USA.
29. Invited speaker, Baylor College of Medicine, Houston, USA, 2019.
30. Speaker, 9th International Conference on Biomolecular Engineering, Irvine, California, USA, 2019.