KANG WU

Associate Professor
Chemical Engineering and Bioengineering
University of New Hampshire
Phone: (603) 862-4388
Email: Kang.Wu@unh.edu

EDUCATION

Ph.D., Chemical Engineering 2008-2010
University of Illinois at Urbana-Champaign
Advisor: Dr. Christopher V. Rao
Dissertation: Dynamic Localization of Chemotaxis Proteins in *Bacillus subtilis*

M.S., Chemical Engineering 2004-2008
University of Illinois at Urbana-Champaign
Advisor: Dr. Christopher V. Rao
Thesis: Comparison of Divergent and Convergent Autoregulatory Genetic Circuits

B.S., Biochemical Engineering 1999-2003
Tianjin University
Advisor: Dr. Xun Chen
Thesis: Construction of Recombinant *Bacillus subtilis* for Riboflavin Production

ACADEMIC POSITIONS

Associate Professor 2019-present
Dept. of Chemical Engineering and Bioengineering
University of New Hampshire

Assistant Professor 2012-2019
Dept. of Chemical Engineering and Bioengineering
University of New Hampshire

Postdoctoral Research Associate 2010-2012
Energy Biosciences Institute & Dept. of Chemical and Biomolecular Engineering,
University of Illinois at Urbana-Champaign
Mentor: Dr. Christopher V. Rao

GRANTS

BIOMADE "Engineering bacterial spore surface for biomanufacturing of recombinant proteins and peptides", 2023-2024

NHIRC "Characterization of mixing and mass transfer of a novel Variable Diameter Bioreactor (VDB) and continuous agitator", 2018-2020

PUBLICATIONS

- X. Jia, T. Liu, Y. Ma and **K. Wu**. "Construction of cadmium whole-cell biosensors and circuit amplification." *Applied Microbiology and Biotechnology*, 105(13):5689-5699. doi: 10.1007/s00253-021-11403-x. (2021)
- X. Jia, Y. Ma, R. Bu, T. Zhao and **K. Wu**. "Directed evolution of a transcription factor PbrR to improve lead selectivity and reduce zinc interference through dual selection." *AMB Express*, 10(1):67. doi: 10.1186/s13568-020-01004-8. (2020)
- X. Jia, Y. Li, T. Xu and **K. Wu**. "Display of lead-binding proteins on Escherichia coli surface for lead bioremediation." *Biotechnology and Bioengineering*, 117(12):3820-3834. doi: 10.1002/bit.27525. (2020)
- X. Jia, R. Bu, T. Zhao, and **K. Wu**. "Sensitive and Specific Whole-Cell Biosensor for Arsenic Detection." *Applied and Environmental Microbiology*, 85(11):e00694-19. doi: 10.1128/AEM.00694-19. (2019)
- G. Wu, E. Drufva, and **K. Wu**. "Fast genome editing in *Bacillus subtilis*." *Engineering in Life Sciences*, 19(6):471-477. doi: 10.1002/elsc.201800164. (2019)
- X. Jia, T. Zhao, Y. Liu, R. Bu, and **K. Wu**. (2018)"Gene circuit engineering to improve the performance of a whole-cell lead biosensor". *FEMS Microbiology Letters, 365, 16,* doi.org/10.1093/femsle/fny157. (2018).
- Zhou, J., **Wu K**. and Rao, C.V. "Evolutionary engineering of *Geobacillus thermoglucosidasius* for improved ethanol production." Biotechnology and Bioengineering, 113(10):2156-67. doi: 10.1002/bit.25983. (2016).
- **K. Wu** and C. V. Rao. "Computational methods in synthetic biology: towards computer-aided part design." *Current Opinion in Chemical Biology*, 16(3-4):318-22 (2012).
- **K. Wu**, H. E. Walukiewicz, G. E. Glekas, G. W. Ordal, and C. V. Rao. "Attractant binding induces distinct structural changes to the polar and lateral signaling clusters in *Bacillus subtilis* chemotaxis." *Journal of Biological Chemistry*, 286(4): 2587-2595 (2011).
- **K. Wu** and C. V. Rao. "The Role of configuration and coupling in autoregulatory gene circuits." *Molecular Microbiology*, 75: 513-527 (2010).
- G. J. Nistala, **K. Wu (co-first author)**, C. V. Rao, and K. D. Bhalerao. "A modular positive feedback-based gene amplifier." *Journal of Biological Engineering*, 4(1): 4 (2010).
- **K. Wu** and C. V. Rao. "Analysis of autoregulatory gene circuits utilizing divergent promoters." Proceedings of the FOSBE Conference, Denver, CO, 153–156 (2009).

PRESENTATIONS

Invited

- "Harness the Power of Synthetic Biology: Engineering of Bacterial Spores for Novel Applications." Department of Chemical Engineering, University of Massachusetts Lowell, Lowell, MA — 12/2024
- "Harness the Power of Synthetic Biology: a robust protein synthesis and display platform." Department of Chemistry, University of New Hampshire, Durham, NH — 11/2017
- "Harness the Power of Synthetic Biology: From Structure to Design." Department of Biochemical Engineering, Tianjin University, Tianjin, China — 08/2014
- "From Biomass to Biofuels: the Power of Synthetic Biology." EITA-New Agriculture 2013, Ithaca, NY. — 06/2013
- "Regulation in Biology: from Structure to Design." Department of Chemical Engineering, University of New Hampshire, Durham, NH — 02/2012

Contributed

- "Reprogramming the interaction between protein regulators and their cognate promoter DNA for heavy metal detection." C. Martel and K. Wu. BIO-SENS Symposium, Biddeford, ME. 7/2023
- "Display of proteins on bacterial spore surface." G. Wu and K. Wu. BIO-SENS Symposium, Biddeford, ME. 7/2023
- "Display of proteins on bacterial spore surface for oral drug delivery." G. Wu and K. Wu. Gordan Research Conference, Mount Snow, VT. 6/2023
- "Display of PAL on spore surface and its application." G. Wu and K. Wu. UNH Bioengineering Symposium, Durham, NH. 5/2023
- "Biosynthesis and delivery of antimicrobial peptides (AMPs)." Z. Su and K. Wu. UNH Bioengineering Symposium, Durham, NH. 5/2019
- "Thermostable LacI for inducible expression in *Geobacilli*." M. Delgado and K. Wu, AIChE Annual Meeting, Pittsburgh, PA. 10/2018
- "Heavy metal detection using transcription factors displayed on bacterial spore surface." J. Hardcastle and K. Wu. SIMB Annual Meeting, Chicago, IL. 8/2018
- "Markerless Genome Editing in *Bacillus subtilis*." G. Wu and K. Wu. UNH Bioengineering Symposium, Durham, NH. 5/2018
- "Synthetic Regulation of Sporulation Genes for Tunable Display of Proteins on Bacterial Spore Surface." J. Wan, E. Drufva, and K. Wu. AIChE Annual Meeting, Minneapolis, MN. 11/2017
- "Multi-Enzyme Display on Bacterial Spore Surface for Plastic Degradation." E. Drufva and K. Wu. AIChE Annual Meeting, Minneapolis, MN. 11/2017
- "Bacterial spores as a robust protein display platform for heavy metal bioremediation." E. Drufva and K. Wu, SIMB Annual Meeting, Denver, CO. 8/2017
- "*In vitro* DNA Assembly for Markerless Gene Replacement in *Bacillus subtilis*." K. Wu. AIChE Annual Meeting, San Francisco, CA. 11/2016
- "Spore Surface Display of a Laccase for Enhanced Robustness." E. Drufva and K. Wu. AIChE Annual Meeting, San Francisco, CA. 11/2016
- "Tunable Spore Surface Display Systems." E. Drufva and K. Wu. SEED Annual Meeting, Chicago, IL. 7/2016
- "Evolutionary Engineering of *Geobacillus thermoglucosidans* for Improved Ethanol Production." J. Zhou, K. Wu, and A. Rivera, and C. V. Rao. AIChE Annual Meeting, Salt Lake City, UT. 11/2015
- "Developing *Geobacillus* for Bioremediation and Biosensing." A. Lade, J. Cullity, and K. Wu, SIMB Annual Meeting, St. Louis, MO. 7/2014
- "Thermostable Laccase for Deconstruction of Lignocellulosic Biomass." T. Castagnaro, T., Maser, and K. Wu, SIMB Annual Meeting, St. Louis, MO. 7/2014
- "Secretory Expression of Laccase from Geobacillus." (Poster) T. Castagnaro and K. Wu, AIChE Annual Meeting, San Francisco, CA. 11/2013
- "Design of Tunable Synthetic Overlapping Divergent Promoters." (Poster) K. Wu, AIChE Annual Meeting, Pittsburgh, PA. 10/2012
- "Spatial Dynamics in Bacterial Signal Transduction." K. Wu and C. V. Rao, AIChE Annual Meeting, Minneapolis, MN. 10/2011

- "Dynamic Localization of the Chemotaxis Proteins in *Bacillus subtilis*." (Poster) K. Wu, H. Rao, G. H. Glekas, G. W. Ordal, and C. V. Rao, ASM Annual Meeting, New Orleans, LA. 05/2011
- "Physical Configuration of Autoregulatory Gene Circuits." K. Wu and C. V. Rao, AIChE Annual Meeting, Nashville, TN. 11/2009
- "Physical Encoding of Autoregulatory Gene Circuits." (Poster) K. Wu and C. V. Rao, Foundations of Systems Biology in Engineering (FOSBE) conference, Denver, CO. 08/2009
- "Localization of the Chemotaxis Proteins in *Bacillus subtilis*." (Poster) K. Wu, H. Rao, G. W. Ordal, and C.V. Rao, Bacterial Locomotion and Signal Transduction (BLAST) Meeting, Cuernavaca, MX. 01/2009
- "Physical Structure of Intracellular Feedback Loop." (**Poster Award**) K. Wu and C. V. Rao, AIChE Annual Meeting, Philadelphia, PA. 11/2008
- "A Novel Synthetic Plasmid Network to Monitor and Control Gene Expression." G. J. Nistala, K. Wu, C. V. Rao, and K. D. Bhalerao, IBE Annual Meeting, St. Louis, MO. 03/2007
- "Engineering Negative Feedback Regulation in Cells", K. Wu and C. V. Rao, AIChE Annual Meeting, Cincinnati, OH. 11/2005

AWARDS

University of New Hampshire

- Summer Faculty Fellowship 2014

University of Illinois at Urbana-Champaign

- Shen Postdoctoral Fellowship 2012
- Graduate College Conference Travel Award 2009
- CAST Director's Award, AIChE 2008

PROFESSIONAL AFFILIATIONS

- American Institute of Chemical Engineers (AIChE)
- American Chemical Society (ACS)
- Society for Industrial Microbiology and Biotechnology (SIMB)
- American Society for Microbiology (ASM)
- International Society for Pharmaceutical Engineering (ISPE)

SYNERGISTIC ACTIVITIES

- Reviewed manuscripts for PLOS ONE, Journal of Biochemical Engineering, Waste Management, Scientific Reports, Engineering in Life Sciences
- Served as program chair at the SIMB annual meeting 2017-2019
- Served on review panel of USDA/AFRI 3/2019, 11/2020, 03/2022, 01/2023, 01/2024, 01/2025, 03/2026
- Served on review panel of NSF/CBET 4/2014
- Chaired sessions at the AIChE Annual Meetings 2013-2019, 2026

PROFESSIONAL DEVELOPMENT

- UNH Pathway to Professorship 2021
- UNH Up-2-NIH 2019-2020
- UNH Writing Academy 8/2018
- UNH FITSI 7/2016
- UNH Writing Academy 5/2015-8/2015
- UNH NSF-Forts Workshop Series 1/2014-4/2014
- AIChE Women Assistant Professors Workshop 11/2013
- Research and Engagement Academy, UNH 1/2013-5/2013

GRADUATE STUDENTS

- Guo Wu, PhD student 9/2017-12/2023
- Zhe Su, Master student 9/2018-1/2021
- Erin Drufva, PhD 9/2013-5/2018
- Anthony Castagnaro, Master of Science 9/2012-9/2014

GRADUATE THESIS COMMITTEE

- "Glycerol Hydrogenolysis to Propanediols over a Heteropoly Acids Modified Platinum-Titanium Dioxide Catalyst." Seth Drahusz, Candidacy exam, Chemical Engineering, University of New Hampshire 1/2026
- "Leveraging Phase Separation to Engineer Biomaterial Microstructures and Regulate Cellular Behavior." Saniya Yesmin Bubli, PhD dissertation, Chemical Engineering, University of New Hampshire. 12/2025
- "Design, Synthesis and Characterization of Small Molecule Organic Semiconductors with Tunable Energy Gaps." Qian Liu, PhD dissertation, Chemistry, University of New Hampshire. 7/2025
- "Investigation of Elastin-like Polymer Surfaces by Electrochemical Impedance Spectroscopy in Redox Mediated and non-Redox Mediated Electrolytes." Stanley Feeney, PhD dissertation, Chemical Engineering, University of New Hampshire. 4/2025
- "LHN Self-Recalibration in Chemical Sensors." Laurel Nelson, Candidacy exam, Bioengineering, University of New Hampshire 3/2025
- "Leveraging Liquid-Liquid Phase Separation to Engineer Biomaterial Microstructures and Regulate Cellular Behavior." Saniya Yesmin Bubli, Candidacy exam, Chemical Engineering, University of New Hampshire 11/2024
- "Gelatin-based Microporous Injectable Hydrogels for In-situ Stem Cell Encapsulation." Seth Edwards, PhD dissertation, Chemical Engineering, University of New Hampshire. 4/2023
- "Bioinspired Phenolic Compounds for Biomedical Devices." Zhen Tian, PhD dissertation, Chemical Engineering, University of New Hampshire. 12/2022
- "Elastin-like Polymers for Use in Thermo-Responsive and Stimuli-Responsive Surfaces for Industry Biosensor Applications." Stanley Feeney, Candidacy exam, Chemical Engineering, University of New Hampshire 11/2022

- "Syntheis of Thioacids and Dicarboxylic Acids Derived from Open β-lactams for Inhibition of Metallo-β-Lactamases." Junfu Chen, PhD dissertation, Chemistry, University of New Hampshire. 12/2021
- "Molecular Simulation Studies of Dynamics and Interactions in Nucleic Acids." Lev Levintov, PhD dissertation, Chemical Engineering, University of New Hampshire. 4/2021
- "Biologically derived melanin-based filtration membrane to reduce biofouling." Tahmineh Rahmani, Oral Exam, Chemical Engineering, University of New Hampshire. 3/2021
- "Computational Studies of Small Molecule Transport and Binding." Yong Liu, PhD dissertation, Chemical Engineering, University of New Hampshire. 11/2020
- "Engineering the interaction between transcription factors and their cognate DNA fragments for in vitro biosensing." Guo Wu, Oral Exam, Chemical Engineering, University of New Hampshire. 9/2020
- "Introduction to Cancer Immunology and Specific Aims." Seth Edwards, Oral Exam, Chemical Engineering, University of New Hampshire. 8/2020
- "Characterization of a Variable Diameter Bioreactor (VDB)." Zhe Su, Master's thesis, Chemical Engineering, University of New Hampshire. 7/2020
- "Injectable Macroporous Hydrogel for Wound Healing and Tissue Engineering." Shujie Hou, PhD dissertation, Chemical Engineering, University of New Hampshire. 5/2019
- "Investigation of Ribosomal Conformational Changes Using Finite Element Analysis." Lev Levintov, Oral Exam, Chemical Engineering, University of New Hampshire. 11/2018
- "Deoxydehydration of Raw Biomass and Biomass-derived Polyols and Sugars to Olefins." Yong Liu, Oral Exam, Chemical Engineering, University of New Hampshire. 4/2018
- "Near Field Electrospun Scaffold that Enhances the Cardiac Tissue Regeneration." Shujie Hou, Oral Exam, Chemical Engineering, University of New Hampshire. 12/2017
- "Simulation Studies of Signaling and Regulatory Proteins." Hossein Mohammadiarani, PhD dissertation, Chemical Engineering, University of New Hampshire. 10/2017
- "Molecular Dynamics Studies of Biomimetic Membranes." Ryan Barden, Master of Science, Chemical Engineering, University of New Hampshire. 5/2017
- "Simulation Studies of a Novel Block Copolymer/PAP Channel Hybrid Membrane with Applications in Molecular Separations." Hossein Mohammadiarani, Oral Exam, Chemical Engineering, University of New Hampshire. 5/2016
- "Molecular Dynamics Studies f Nucleic Acid-Protein Complexes." Tyler Mulligan, Master of Science, Chemical Engineering, University of New Hampshire. 11/2015
- "Efficiency Improvement of Silicon Thin-film Solar Cells by Surface Plasmon Method." Oral exam, Ye Deng, Chemical Engineering, University of New Hampshire. 09/2014
- "A Rotating Ring-disk Electrode Study of Potential Oscillations during Galvanostatic Copper Electrodeposition in a Leveler-accelerant System." Rui 04/2014

Chang, Master of Science, Chemical Engineering, University of New Hampshire.

- "Fabrication of Bio-based Activated Carbons for Removal of Aqueous Pharmaceuticals." Chloe Hintz, Master of Science, Chemical Engineering, University of New Hampshire. 04/2014
- "Production of Bio-Jet Fuel from Microalgae." Marian Elmoraghy, Master of Science, Chemical Engineering, University of New Hampshire. 08/2013

UNDERGRADUATE RESEARCHERS ADVISED

- Lauren Dranchak 9/2026-present
- Duru Elbi (REAP 2026) 1/2026-8/2026
- Sara Camargo Santiesteban (REAP 2026) 1/2026-present
- Addison Kish (SURF 2025) 1/2024-present
- Jayden Hartigan (SURF 2025, VK Marthur 2024, 2026) 9/2023-Present
- Eric Boheen (REAP 2024, Goldwater 2025) 9/2023-Present
- Charlotte Martel (SURF 2023) 5/2023-5/2024
- Charlotte Thomas (REAP 2022) 9/2021-10/2022
- Kevin Liang (REAP 2022) 9/2021-8/2022
- Myranda Sims (SURF 2022) 9/2021-5/2022
- Joseph Tumidajski (SURF 2019) 1/2019-5/2020
- Mrinal Ganash (REAP 2019) 11/2018-5/2020
- Adam Rosenbaum (SURF 2019, SURF 2020) 11/2018-5/2021
- Griffin Kane (SURF 2019, SURF 2020) 9/2018-5/2021
- Zhiyu Yang 9/2018-5/2019
- Justin Hardcastle (SURF 2018) 2/2018-5/2019
- Matilda Delgado (REAP 2018) 9/2017-5/2021
- Joshua Cote 2/2018-8/2019
- Sydney Reid 4/2018-8/2018
- Tingman Zhang 2/2018-76/2019
- Brady Camplin (presented at URC 2016; SURF 2016; SURF 2017) 8/2015-5/2018
- Lucas Prevost (URA Fall 2017) 9/2017-12/2017
- Sean Thompson 1/2017-5/2017
- Jiacheng Wan (presented at URC 2017) 8/2015-5/2017
- Sofia Diaco (presented at URC 2017) 9/2016-5/2017
- Nicole Torosian from Cornell University 5/2016-8/2016
- Michael Pappas (presented at URC 2016) 5/2015-5/2016
- Sachi Nagada (presented at URC 2015) 8/2014-8/2015
- Abra Roberts from Boston University 5/2014-8/2015
- Halie White (presented at URC 2015 and won the First Prize) 5/2014-5/2015
- Pablo Yangali (presented at URC 2015) 1/2015-5/2015
- Ryan McEachern 5/2014-8/2014
- Brittany Artale (presented at URC 2014 and AICHE regional conference 2014) 1/2014-5/2014
- Gareth Clarke 1/2014-5/2014

- Travis Maser 1/2014-5/2014
- Amanda Lade (presented at URC 2014 and won the Honorable Mention Poster Award) 9/2013-5/2014
- Justin Cullity (presented at URC 2013 and 2014) 1/2013-5/2014
- Kelsey Price 9/2013-12/2013
- Runzhi He (presented at URC 2013) 1/2013-5/2013

HIGH SCHOOL STUDENT RESEARCHERS ADVISED

- Miranda Saysouk 6/2017-8/2017
- Alyssa Currier 6/2017-8/2017
- Amber Gurecki 6/2016-8/2016
- Matilda Delgado 6/2016-8/2016

COURSES TAUGHT

- CHBE 501 Introduction to Chemical Engineering I, Bioengineering session Fall 2017, Fall 2018, Fall 2019,
- CHBE 501 Introduction to Chemical Engineering I Fall 2021, Fall 2022, Fall 2024
- CHBE 502 Introduction to Chemical Engineering II Spring 2022, Spring 2023
- CHBE 916 Diffusive Mass Transfer Spring2013, Spring 2014, Fall 2015, Fall 2016
- CHBE 761 Biochemical Engineering Fall 2013, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024, Spring 2025, Spring 2026
- CHBE 604 Chemical Engineering Thermodynamics Spring 2013
- CHBE 703 Mass Transfer and Stagewise Separations Fall 2012, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2023, Fall 2025, Fall 2026
- CHBE 900 CHBE seminars Fall 2023, Fall 2024, Fall 2025, Fall 2026

SERVICE

- ABET Committee 2022-2023
- CEPS CAPC Committee 2021
- Undergraduate Coordinator CHE/BENG 2019-present
- Department Tenure Committee Chair 2021, 2022, 2023
- Committee for lecturer search Spring 2019
- Faculty Advisor for ISPE-UNH Student Chapter 2013-present
- Committee for CEPS Graduate Fellowships 2017
- Faculty Senate 8.2013-5.2016
- Judge of Nottingham Science Fair 3/2014, 3/2015
- Interviewer of CEPS Industrial Scholarship 3/2013

OUTREACH ACTIVITIES

- Tech Camp 2017-2019
- Research Experience for Teachers in Engineering (RETE) 2014-2019, 2023
- Project SMART 2014-2018
- iGEM UNH team 2015-2016
- KEEPERS CAMP 2014-2015