



## Yi OUYANG

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### Professional Experience

2025 – now Associate Professor, Ghent University (UGent), Laboratory for Chemical Technology, Belgium

2022 – 2025 Assistant Professor, UGent, Laboratory for Chemical Technology, Belgium

2024 – 2025 Guest Professor, Faculty of Engineering Science, KU Leuven (KUL), Belgium

2023 - 2023 Visiting Research Fellow, University College London, UK, collaborator: Prof. Marc-Olivier Coppens

2020 - 2023 FWO Post-doctoral researcher, UGent, Belgium, collaborator: Prof. Kevin Van Geem

2019 - 2020 Post-doctoral Researcher, UGent, Belgium, collaborator: Prof. Kevin Van Geem

2017 - 2018 Visiting Ph.D. Fellow, Washington University in St. Louis (WUSTL), US, promoter: Prof. Ramesh Agarwal

2014 - 2019 Ph.D. in Chemical Engineering, Beijing University of Chemical Technology, China, promoter: Prof. Jian-Feng Chen, *Outstanding Graduate of Beijing in the Year of 2019 & Excellent Doctoral Dissertation*

### Projects

2026 ERC Starting Grant 2025, Electrified CO<sub>2</sub> Capture using HiGee Vortex Reactors, 5-year project, <https://cordis.europa.eu/project/id/101220341>

2025 Flemish Moonshot Program, Later Stage Innovation, Optimal CO<sub>2</sub> post-combustion capture process through advanced thermal integration and vortex technology, 3-year project

2023 Francqui Start-Up Grant, 3-year project

2024 FWO medium-sized research infrastructure, Ultra-high speed imaging: Opening up new horizons for the identification of dynamic phenomena in science

2022 Special Research Fund: Chemical Process Intensification by Multi-scale Computation & Modelling, 4-year project

2020 Flanders Industry Innovation Moonshot project: Intensification of CO<sub>2</sub> capture processes (CAPTIN-1 and CAPTIN-2), 4-year project

2022 Marie Skłodowska-Curie Action "Smart and CO<sub>2</sub> neutral Olefin Production by arTificial Intelligence and MAchine Learning" (OPTIMAL), 4-year project

2025 Promoter of FWO postdoctoral fellowship "IGNITE – Innovative Gas-Liquid Systems: Visualization and Modelling for Electrified Reactor Design"

2024 Promoter of FWO PhD fellowship "A smart sustainable and stable Mars ISRU process for production of O<sub>2</sub> and value-added chemicals", 4-year project

2024 Co-Promoter of FWO PhD fellowship "Electrification of thermocatalytic decomposition of methane using computational fluid dynamics"

2020 FWO Postdoctoral Fellowship: Visualization, Modelling and Computation based Process Intensification of CO<sub>2</sub> Capture, 3-year project

### Commission of Trust – Editorships

2024 Editor, *Chemical Engineering Research and Design*

2024 Editorial Board member, *Chemical Engineering Journal*

2024 Early Career Advisory Board member, *Chemical Engineering and Processing - Process Intensification*

2024 Guest Editor for the special issue "AI for PI", *Chemical Engineering and Processing - Process Intensification*

2024 Guest Editor for the special issue "High Gravity Chemical Engineering", *Current Opinion in Chemical Engineering*

2023 Guest editor for the special issue "MTCUE-2022", *Industrial & Engineering Chemistry Research*

## Educational Activities

2024 – Now Lecturer in charge, E071190 - Process intensification, 3 ECTS, UGent

2025 – Now Co-lecturer, E045910 - Heat Engineering and Mass Transport, 6 ECTS, UGent

2023 – Now Co-lecturer, E040533 - Computational Fluid Dynamics in Chemical Technology, 3 ECTS, UGent

2024 – Now Co-lecturer, E070080- Chemical Thermodynamics, 6 ECTS, UGent

2025 – Now Coordinator, "3+2" cooperative education scheme agreement between UGent and ECUST

2024 – 2025 Lecturer - Guest Professor, B-KUL-H09E5A- Process intensification, 3 ECTS, KU Leuven

2022 – 2025 Lecturer in charge, E052730 - Building Chemistry, 3 ECTS, UGent

2022 – 2023 Lecturer in charge, E070160 - Chemistry: Selected Topics, 3 ECTS, UGent

## Professional and Scientific Societies and Activities

2026 Member of Scientific Committee, 4th International Process Intensification Conference (IPIC4), upcoming.

2025 Session Chair in Session 9: Inherent Safety and Process Intensification of Chemical Processes, The 12th World Congress of Chemical Engineering and the 21st Asian Pacific Confederation of Chemical Engineering Congress (WCCE 12 & APCChE 2025), July 14<sup>th</sup> to 18<sup>th</sup>, 2025, Beijing, China.

2025 Member of Scientific Committee, Session Chair of Mass Transfer and HiGee, The 9th European Process Intensification Conference (EPIC 2025), June 4th to 6th, 2025, Athens, Greece.

2025 Member of Scientific Committee, in The International Conference on Mathematics in (bio/food) Chemical Kinetics and Engineering (MaCKiE) 2025, September 3 -5, Izmir, Turkey.

2025 Keynote Speaker, Future Chemical Engineering Scholar Forum, GACCE-2025, 13-18 August 2025, Queenstown & Auckland, New Zealand.

2024 Keynote speaker, Member of conference organizing committee, Session Chair in the Third International Process Intensification Conference (IPIC3), May 28th to 31st 2024, Beijing, China.

2023 Keynote speaker, The 12th International Conference on Chemical Kinetics (ICCK), June 26 to June 29, 2023, Hefei, China.

2025 Session Chair in 12th International Symposium on Catalysis in Multiphase Reactors and 11th International Symposium in Multifunctional Reactors (CAMURE 12 & ISMR 11), 8-11 September 2024, Belgium.

2022 Session Chair of Engineering processes & products, Process and Plant Design I in 13th ECCE and 6th ECAB.

2024 – Now Member of Centre for Advanced Process Technology for Urban Resource Recovery (CAPTURE), interdisciplinary collaboration UGent, VITO, UAntwerp and VUB: <https://capture-resources.be>

2022 – Now Member of Centre for Sustainable Chemistry (CSC), UGent

2022 Invited Seminar, Hong Kong University of Science and Technology. Title: Development of intensified reactors: A process intensification methodology perspective. Hongkong

2021 Invited EFCE Spotlight Talk 2021, European Federation of Chemical Engineering Spotlight Talks 2021, Title: CO<sub>2</sub> Absorption/Capture Modelling by Computational Fluid Dynamics Validated with Experimental Data.

2021 Invited Talk, International conference on mathematics in (bio)chemical kinetics and engineering 2021 (MaCKiE 2021) Title: Process intensification in a gas-liquid vortex reactor.

2018 – Now Peer reviewer for the following journals: I&EC Research 2023 Excellence in Review Award, Reviewing Editor of Springer Nature, Nature communications, Nature Chemical Engineering, Chemical Engineering Journal, Engineering, Current Opinion in Chemical Engineering, IEEE Transactions on Neural Networks and Learning Systems, Fuel, Chemical Engineering Science, AIChE Journal, Industrial & Engineering Chemistry Research, Chemical Engineering and Processing: Process Intensification, Chemical Engineering Research and Design, and others.

## SELECTED PUBLICATIONS

1. A. Kourou, S. Chen, T. Tillekeratne, G.J. Heynderickx, **Y. Ouyang\***, K.M. Van Geem, Direct air capture: novel contactor designs and intensification strategies, *Curr Opin Chem Eng* 50 (2025)
2. H. Hoorijani, **Y. Ouyang\***, G.J. Heynderickx, K.M. Van Geem, Data across the scales: data-driven multiphase flow reactor modeling, *Curr Opin Chem Eng* 50 (2025) 101193.
3. P. Govea-Alvarez, Z. Chen, D. Pant, K.M. Van Geem, **Y. Ouyang\***, Integrating Electrochemical CO<sub>2</sub> Reduction Technology for Smart, Sustainable, and Stable In-Situ Resource Utilization for Outer-Space Applications, *Engineering* (2025).
4. J. Mao, W. Shi, **Y. Ouyang\***, X. Zhang, B. Zheng, H. Yang, Y. Huang, N. Zhang, J. Ye, M. Xiao, Y. Yang\*, Modeling bubble dynamics in rotating foam stirrer reactors: A computational fluid dynamics approach incorporating gas–solid interactions, *AIChE Journal* (2025).
5. A. Kourou, S. Chen, **Y. Ouyang\***, Gas-Liquid and Liquid-Liquid Vortex Technology for Process Intensification, *Curr Opin Chem Eng* (2025).
6. **Y. Ouyang**, G.J. Heynderickx, K.M. Van Geem, Development of intensified reactors: A process intensification methodology perspective, *Chemical Engineering and Processing–Process Intensification*. 181 (2022) 109164.
7. A. Kourou, S. De Langhe, L. Nelis, Y. Ureel, M. Ruitenbeek, K. Biesheuvel, R. Wevers, **Y. Ouyang\***, K.M. Van Geem\*, Electrification pathways for sustainable syngas production: A comparative analysis for low-temperature Fischer-Tropsch technology, *Int J Hydrogen Energy* 81 (2024) 974–985.
8. S. Chen, X. Lang, A. Kourou, S. Dutta, K.M. Van Geem, **Y. Ouyang\***, G.J. Heynderickx, Enhancing CO<sub>2</sub> capture efficiency: Computational fluid dynamics investigation of gas-liquid vortex reactor configurations for process intensification, *Chemical Engineering Journal* 493 (2024).
9. S. Dutta, S. Roy, X. Lang, S. Chen, R. Kumar, C. Loha, T. Verspeelt, K.M. Van Geem, G.J. Heynderickx, **Y. Ouyang\***, Process Intensification of CO<sub>2</sub> Desorption in a Gas-Liquid Vortex Reactor, *Ind Eng Chem Res* (2024).
10. S. Chen, J. Verding, X. Lang, **Y. Ouyang\***, G.J. Heynderickx, K.M. Van Geem, Advances in design of internals: Applications in conventional and process intensification units, *Chemical Engineering and Processing - Process Intensification* 201 (2024) 109806.
11. S. Chen, P. Malego, K.M. Van Geem, **Y. Ouyang\***, G.J. Heynderickx, Design and Optimization of Gas-Liquid Vortex Unit Using Computational Fluid Dynamics (CFD) Simulation, *Ind Eng Chem Res* 62 (2023) 17068–17083.
12. K.-L. Tang, **Y. Ouyang\***, R.K. Agarwal, J.-M. Chen, Y. Xiang, J.-F. Chen, Computation of gas-liquid flow in a square bubble column with Wray-Agarwal one-equation turbulence model, *Chem Eng Sci.* 218 (2020) 115551.
13. L. Zheng, Y. Qi, H. Liao, H. Zou, **Y. Ouyang \***, Y. Luo \*, J.-F. Chen. Liquid-liquid flow pattern and mass transfer in a rotating millimeter channel reactor. *Chemical Product and Process Modeling.* (2024).
14. H. Jin, H. Zhong, **Y. Ouyang**, Q. Guo, Q. Xiong, Multiphase Transportation, Conversion, & Utilization of Energy in Chemical Engineering: A Special Issue for MTCUE-2022, *Ind Eng Chem Res* 62 (2023) 16945–16948.
15. **Y. Ouyang**, L.A. Vandewalle, L. Chen, P.P. Plehiers, M.R. Dobbelaere, G.J. Heynderickx, G.B. Marin, K.M. Van Geem, Speeding up turbulent reactive flow simulation via a deep artificial neural network: A methodology study, *Chemical Engineering Journal*. 429 (2022) 132442.
16. **Y. Ouyang**, M.N. Manzano, R. Wetzel, S. Chen, X. Lang, G.J. Heynderickx, K.M. Van Geem, Liquid hydrodynamics in a gas-liquid vortex reactor, *Chem Eng Sci.* 246 (2021) 116970.
17. **Y. Ouyang**, M. Nunez Manzan, S. Chen, R. Wetzel, T. Verspeelt, K.M. Van Geem, G.J. Heynderickx, Chemisorption of CO<sub>2</sub> in A Gas-Liquid Vortex Reactor: An Interphase Mass Transfer Efficiency Assessment, *AIChE Journal.* (2022) e17608.
18. **Y. Ouyang**, M.N. Manzano, K. Beirnaert, G.J. Heynderickx, K.M. Van Geem, Micromixing in a gas–liquid vortex reactor, *AIChE Journal.* 67 (2021) e17264.
19. **Y. Ouyang**, K.-L. Tang, Y. Xiang, H.-K. Zou, G.-W. Chu, R.K. Agarwal, J.-F. Chen, Evaluation of various turbulence models for numerical simulation of a multiphase system in a rotating packed bed, *Comput Fluids.* 194 (2019) 104296.

20. **Y. Ouyang**, Y. Xiang, X.-Y. Gao, H.-K. Zou, G.-W. Chu, R.K. Agarwal, J.-F. Chen, Micromixing efficiency optimization of the premixer of a rotating packed bed by CFD, *Chemical Engineering and Processing-Process Intensification*. 142 (2019) 107543.
21. **Y. Ouyang**, H.-K. Zou, X.-Y. Gao, G.-W. Chu, Y. Xiang, J.-F. Chen, Computational fluid dynamics modeling of viscous liquid flow characteristics and end effect in rotating packed bed, *Chemical Engineering and Processing-Process Intensification*. 123 (2018) 185–194.
22. **Y. Ouyang**, Y. Xiang, X.-Y. Gao, W.-L. Li, H.-K. Zou, G.-W. Chu, J.-F. Chen, Micromixing efficiency in a rotating packed bed with non-Newtonian fluid, *Chemical Engineering Journal*. 354 (2018) 162–171.
23. **Y. Ouyang**, S. Wang, Y. Xiang, Z. Zhao, J. Wang, L. Shao, CFD analyses of liquid flow characteristics in a rotor-stator reactor, *Chemical Engineering Research and Design*. 134 (2018) 186–197.
24. **Y. Ouyang**, Y. Xiang, H. Zou, G. Chu, J. Chen, Flow characteristics and micromixing modeling in a microporous tube-in-tube microchannel reactor by CFD, *Chemical Engineering Journal*. 321 (2017) 533–545.

## PATENTS

1. **Y. Ouyang**, K.M. Van Geem, G.J. Heynderickx. Chamber unit for swirling flow interaction. Priority patent filing with reference number EP 24210157.4. filed June 30, 2024.
2. **Y. Ouyang**, S. Chen, T. Verspeelt, K.M. Van Geem, G.J. Heynderickx. A chamber unit for a fluid fluid vortex contactor and a reactor comprising such a unit. WO/2025/003397. filed June 28, 2024; priority EP 23182595.1