

Dr. Qingang Xiong

Postdoctoral Research Associate
Computer Science and Mathematics Division
Oak Ridge National Laboratory
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Education

- 2005.9~2011.6 **Ph. D in Chemical Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China**
Dissertation: Direct numerical simulation and statistical analysis of large-scale gas-solid systems
Supervisors: Prof. Wei Ge and Prof. Jinghai Li
- 2001.9~2005.6 **B. Sc in Polymer Materials Science and Engineering, Wuhan University of Technology, Wuhan, China**

Research interests

Fluid mechanics	Computational fluid dynamics
Multiphase flows	Grid-based and mesh-free numerical methods
Catalysis	Parallel computing
Biomass pyrolysis	General-purpose GPU scientific computing
Heat and mass transfer	Multi-scale coupling
Nanoscale	Molecular dynamics

Journal articles (* = Corresponding author; Citations > 450)

1. **Qingang Xiong**, Wei Ge*, Massive parallel simulation of gas-solid suspension with macro-scale particle method, *e-Science Technology & Application 1* (2008) 12-19 (Invited article; In Chinese).
2. Jingsen Ma, Wei Ge*, **Qingang Xiong**, Junwu Wang, Jinghai Li, Direct numerical simulation of particle clustering in gas-solid flow with a macro-scale particle method, *Chemical Engineering Science 64* (2009) 43-51.
3. Limin Wang*, Guofeng Zhou, Xiaowei Wang, **Qingang Xiong**, Wei Ge, Direct numerical simulation of particle-fluid systems by combining time-driven hard-sphere model and lattice Boltzmann method, *Particuology 8* (2010) 379-382 (Cover Page Article).
4. **Qingang Xiong**, Bo Li, Feiguo Chen, Jingsen Ma, Wei Ge*, Jinghai Li, Direct numerical simulation of sub-grid structures in gas-solid flow—GPU implementation of macro-scale pseudo-particle modeling, *Chemical Engineering Science 65* (2010) 5356-5365.
5. **Qingang Xiong**, Lijuan Deng, Wei Wang*, Wei Ge*, SPH method for two-fluid modeling of particle-fluid fluidization, *Chemical Engineering Science 66* (2011) 1859-1865 (Top Cited Paper).
6. Guofeng Zhou, Limin Wang*, Xiaowei Wang*, **Qingang Xiong**, Wei Ge, Direct numerical simulation scheme for particle-fluid systems based on a time-driven hard-sphere model and the lattice Boltzmann method, *Chinese Science Bulletin 56* (2011) 1246-1256 (In Chinese).
7. Wei Ge, Wei Wang, Ning Yang, Jinghai Li*, Mooson Kwauk, Feiguo Chen, Jianhua Chen, Xiaojian Fang, Li Guo, Xianfeng He, Xinhua Liu, Yaning Liu, Bona Lu, Jian Wang, Junwu Wang, Limin Wang, Xiaowei Wang, **Qingang Xiong**, Ming Xu, Lijuan Deng, Yongsheng Han, Chaofeng Hou, Leina Hua, Wenlai Huang, Bo Li, Chengxiang Li, Fei Li, Ying Ren, Ji Xu, Nan Zhang, Yun Zhang, Guofeng Zhou, Guangzheng Zhou, Meso-scale oriented simulation towards virtual process engineering (VPE)—the EMMS Paradigm, *Chemical Engineering Science 66* (2011)

8. **Qingang Xiong**, Bo Li, Ji Xu, Xiaojian Fang, Xiaowei Wang*, Limin Wang*, Xianfeng He, Wei Ge, Efficient parallel implementation of the lattice Boltzmann method on large clusters of graphic processing units, *Chinese Science Bulletin* 57 (2012) 707-715 (Invited Article).
9. **Qingang Xiong**, Bo Li, Guofeng Zhou, Ji Xu, Xiaojian Fang, Junwu Wang, Xianfeng He, Xiaowei Wang*, Limin Wang*, Wei Ge, Jinghai Li, Large-scale DNS of gas-solid flow on Mole-8.5, *Chemical Engineering Science* 71 (2012) 422-430 (Top Cited Paper).
10. **Qingang Xiong**, Bo Li, Ji Xu, Xiaowei Wang, Limin Wang, Wei Ge*, Efficient 3D DNS of gas-solid flows on Fermi GPGPU, *Computers & Fluids* 70 (2012) 86-94.
11. **Qingang Xiong***, Bo Li, Ji Xu, GPU-accelerated particle splitting and merging in SPH, *Computer Physics Communications* 184 (2013) 1701-1707.
12. **Qingang Xiong**, Song-Charng Kong*, Alberto Passalacqua, Development of a generalized numerical framework for simulating biomass fast pyrolysis in fluidized-bed reactors, *Chemical Engineering Science* 99 (2013) 305-313.
13. **Qingang Xiong**, Soroush Aramideh, Song-Charng Kong*, Modeling effects of operating conditions on biomass fast pyrolysis in bubbling fluidized bed reactors, *Energy & Fuels* 27 (2013) 5948-5956.
14. Ehsan Madadi-Kandjani, **Qingang Xiong***, Validity of the spring-backed membrane model for bubble-wall interactions with compliant walls, *Computers & Fluids* 96 (2014) 116-121.
15. **Qingang Xiong**, Song-Charng Kong*, Modeling effects of interphase transport coefficients on biomass pyrolysis in fluidized beds, *Powder Technology* 262 (2014) 96-105.
16. **Qingang Xiong**, Soroush Aramideh, Alberto Passalacqua, Song-Charng Kong*, BIOTC: An open-source CFD code for simulating biomass fast pyrolysis, *Computer Physics Communications* 185 (2014) 1739-1746.
17. **Qingang Xiong***, Soroush Aramideh, Song-Charng Kong, Assessment of devolatilization schemes in predicting product yields of biomass fast pyrolysis, *Environmental Progress & Sustainable Energy* 33 (2014) 756-761.
18. **Qingang Xiong**, Ehsan Madadi-Kandjani, Giulio Lorenzini*, A LBM-DEM solver for fast discrete particle simulation of particle-fluid flows, *Continuum Mechanics and Thermodynamics* 26 (2014) 907-917.
19. Guofeng Zhou, **Qingang Xiong**, Limin Wang*, Xiaowei Wang, Xinxin Ren, Wei Ge*, Structure-dependent drag in gas-solid flows studied with direct numerical simulation, *Chemical Engineering Science* 116 (2014) 9-22.
20. Goong Chen, **Qingang Xiong**, Philip J. Morris, Eric G. Paterson, Alexey Sergeev, Yi-Ching Wang, OpenFOAM for computational fluid dynamics (CFD), *Notices of the American Mathematical Society* 61 (2014) 354-363.
21. **Qingang Xiong**, Soroush Aramideh, Alberto Passalacqua, Song-Charng Kong*, Characterizing effects of the shape of screw conveyors in gas-solid fluidized beds using advanced numerical models, *ASME Journal of Heat Transfer* 137 (2015) 061008.
22. Soroush Aramideh, **Qingang Xiong** (Co-first author), Song-Charng Kong*, Robert Brown, Numerical simulation of biomass fast pyrolysis in an auger reactor, *Fuel* 156 (2015) 234-242.
23. Jingchao Zhang, Fei Xu, Yang Hong, **Qingang Xiong***, Jianming Pan*, A comprehensive review on the molecular dynamics simulation of the novel thermal properties of graphene, *RSC Advances* 5 (2015) 89415-89426 (Invited Review Article).
24. **Qingang Xiong***, Fei Xu, Emilio Ramirez, Sreekanth Pannala, C. Stuart Daw*, Modeling the impacts of bubbling bed hydrodynamics on tar yield and its fluctuations during biomass fast pyrolysis, *Fuel* 164 (2016) 11-17.
25. **Qingang Xiong***, Jingchao Zhang, Fei Xu, Gavin Wiggins, C. Stuart Daw*, Coupling DAEM and CFD for simulating biomass fast pyrolysis in fluidized beds, *Journal of Analytical and Applied Pyrolysis*, In press.
26. Sourav Gur, Thomas Danielson, **Qingang Xiong** (Co-first author), Celine Hin, Sreekanth Pannala, George Frantziskonis*, Aditya Savara, C. Stuart Daw, Wavelet-based surrogate time series for multiscale simulation of heterogeneous catalysis, *Chemical Engineering Science*, Under Review.
27. Jingchao Zhang, Yang Hong, Fei Xu, **Qingang Xiong***, Cross-plane thermal conductance between phosphorene and silicon substrate: A molecular dynamics study, *Chemical Communications*, Under Review.
28. Yunlei Zhang, Yao Chen, Yating Shen, Yongsheng Yan*, Jianming Pan*, **Qingang Xiong***, Weidong Shi, Longbao Yu,

Hierarchically carbonaceous catalysts containing Brønsted and Lewis acid sites: design, synthesis and catalytic activity, *Catalysis Science and Technology*, Under Review.

29. Jianming Pan*, Heping Gao, **Qingang Xiong***, Yunlei Zhang, Jun Zeng, Fabrication of hydrophobic polymer foams with double acid sites on surface of macropore for conversation of carbohydrate, *Chemical Engineering Journal*, Under Review.
30. Emilio Ramirez*, **Qingang Xiong**, Sreekanth Pannala, E.A. Charles Finney, C. Stuart Daw, Identifying the bubbling-to-slugging transition in a laboratory-scale fluidized bed, to be submitted to *AIChE Journal*.

Awards and honors

1. Certificates of Outstanding Reviewers for *Chemical Engineering & Processing: Process Intensification*, *Chemical Engineering Science*, *Advances in Water Resources*, *Energy Conversion and Management*, *International Journal of Heat and Fluid Flow*, *Applied Energy*, *Applied Thermal Engineering*, *Powder Technology*, and *Computers & Chemical Engineering*.
2. Certificate of Top Cited Paper in *Chemical Engineering Science* for 2011 and 2012.
3. 3rd Place Poster Competition in *Iowa NSF EPSCoR Annual Meeting 2013*.
4. The 5th contributor (totally fourteen awardees) to the Best Award of Supercomputing Application, Chinese Academy of Sciences, 2013.
5. Third-rate scholarship, Institute of Process Engineering, Chinese Academy of Sciences for the year of 2006, 2009, 2010, and 2011.
6. Third-rate scholarship, Wuhan University of Technology, China, 2003.
7. Three A's student, Wuhan University of Technology, China, 2003-2004 academic year.

Conference presentations and posters

1. Wei Ge, Wei Wang, Weigang Dong, Junwu Wang, Bona Lu, **Qingang Xiong**, Jinghai Li, Meso-Scale Structure—A Challenge of Computational Fluid Dynamics for Circulating Fluidized-Bed Risers. *The 9th International Conference on Circulating Fluidized Beds*, May 13-16, 2008, Hamburg, Germany, (Keynote Oral Presentation).
2. **Qingang Xiong**, Bo Li, Wei Ge, Jinghai Li, Statistical Analysis in Two-Dimensional Gas-Solid Suspensions. *The 6th International Conference on Particle Technology*, December 8-11, 2008, Shanghai, China, (Oral Presentation).
3. **Qingang Xiong**, Exploring the Heterogeneity in Gas-Solid Suspensions with a Macro-Scale Particle Method Implemented on GPUs. *The 6th International Conference on Meso-scale Methods in Engineering and Science*, July 13-17, 2009, Guangzhou, China, (Oral Presentation).
4. Limin Wang, Xiaowei Wang, **Qingang Xiong**, Guofeng Zhou, Wei Ge, LBM Simulation of Multi-phase Flow—Large-Scale Parallel Implementation on the Mole-8.5 GPGPU Supercomputer. *SIAM Conference on Computational Science and Engineering*, Feb 28-Mar 4, 2011, Reno, Nevada, United States, (Oral Presentation).
5. **Qingang Xiong**, Song-Chang Kong, Modeling Biomass Fast Pyrolysis Reactors Using OpenFOAM. *Iowa NSF EPSCoR Annual Meeting 2012*, July 31, 2012, Iowa City, Iowa, United States, (Poster).
6. **Qingang Xiong**, Song-Chang Kong, Modeling Drag Effects on Biomass Pyrolysis in Fluidized-Bed Reactors. *AIChE Annual Meeting 2012*, October 28-November 2, 2012, Pittsburg, United States, (Oral Presentation).
7. Soroush Aramideh, **Qingang Xiong**, Song-Chang Kong, Modeling Effects of Interphase Transport Coefficients on Biomass Fast Pyrolysis in Bubbling Fluidized Beds. *Iowa NSF EPSCoR Annual Meeting 2013*, July 23, 2013, Waterloo, Iowa, United States, (Poster).
8. **Qingang Xiong**, Soroush Aramideh, Song-Chang Kong, Investigating the Effects of Interphase Transport Coefficients on Biomass Fast Pyrolysis in Bubbling Fluidized Beds. *The 3rd International Conference on Thermochemical Biomass Conversion Science*, September 3-6, 2013, Chicago, United States, (Poster).
9. **Qingang Xiong**, Song-Chang Kong, An Open-Source Code Developed for Biomass Pyrolysis in Fluidized-Bed Reactors. *AIChE Annual Meeting 2013*, November 3-8, 2013, San Francisco, United States, (Oral Presentation).
10. **Qingang Xiong**, Song-Chang Kong, Direct Numerical Simulation of Biomass Particles During Pyrolysis. *ASME*

2013 *International Mechanical Engineering Congress & Exposition*, November 16-21, San Diego, United States, (Oral Presentation).

11. **Qingang Xiong**, Song-Chang Kong, Effects of Interphase Coefficient on Biomass Pyrolysis in Fluidized-Bed Reactors. *ASME 2013 International Mechanical Engineering Congress & Exposition*, November 16-21, San Diego, United States, (Oral Presentation).
12. **Qingang Xiong**, Jingsen Ma, Song-Chang Kong, A GPU-Accelerated LBM+DEM Solver for Discrete Particle Simulation of Large-Scale Particle-fluid Flows. *ASME 2014 4th Joint US-European Fluids Engineering Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels*, August 3-7, 2014, Chicago, United States, (Invited Presentation).
13. Jingsen Ma, **Qingang Xiong**, Introduction of HPC Using OpenMP and CUDA. *ASME 2014 4th Joint US-European Fluids Engineering Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels*, August 3-7, 2014, Chicago, United States, (Invited Tutorial Presentation).
14. Song-Chang Kong, **Qingang Xiong**, Alberto Passalacqua, Robert Brown, Computational Framework for Simulating Biomass Fast Pyrolysis in Various Reactor Geometries. *TCS 2014: Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products*, September 2-5, 2014, Denver, United States, (Oral Presentation).
15. **Qingang Xiong**, Song-Chang Kong, Direct Numerical Simulation of Biomass Particle Under Fast Pyrolysis Reactor Conditions. *AIChE Annual Meeting 2014*, November 16-21, 2014, Atlanta, United States, (Oral Presentation).
16. **Qingang Xiong**, Emilio Ramirez, Sreekanth Pannala, C. Stuart Daw, Modeling the Impact of Bubbling Bed Hydrodynamics on Tar Yield Oscillation of Biomass Fast Pyrolysis. *2015 NETL Workshop on Multiphase Flow Science*, August 12-13, 2015, Mogantown, United States, (Oral Presentation).
17. Emilio Ramirez, **Qingang Xiong**, Sreekanth Pannala, C. Stuart Daw, A Numerical Investigation Using Pressure Measurements to Develop Methods That Can Detect the Slugging Transition in Fluidized Beds. *2015 NETL Workshop on Multiphase Flow Science*, August 12-13, 2015, Mogantown, United States, (Poster).
18. **Qingang Xiong**, Sreekanth Pannala, C. Stuart Daw, Incorporating Intra-Particle Temperature Gradient in Dpm Modeling of Biomass Fast Pyrolysis. *AIChE Annual Meeting 2015*, November 8-13, 2015, Salt Lake City, United States, (Oral Presentation).
19. **Qingang Xiong**, Sreekanth Pannala, C. Stuart Daw, Aditya Savara, H. Steven Overbury, Multi-Scale CFD+kMC Simulation of Methanol Partial Oxidation over Ceria in a Fixed Bed. *AIChE Annual Meeting 2015*, November 8-13, 2015, Salt Lake City, United States, (Oral Presentation).
20. **Qingang Xiong**, Modeling the Impact of Bubbling Bed Hydrodynamic Oscillations on the Yield of Biomass Fast Pyrolysis Oil. *AIChE Annual Meeting 2015*, November 8-13, 2015, Salt Lake City, United States, (Poster).

Book chapters

1. Wei Ge, Feiguo Chen, Fanyong Meng, Chaofeng Hou, Ji Xu, Bo Li, **Qingang Xiong**, Xiaowei Wang, Xipeng Li, Parallel Computing of Multi-Scale Discrete Methods Based on GPUs. Science Press (In Chinese). 2009.
2. Wei Ge, Ji Xu, **Qingang Xiong**, Xiaowei Wang, Feiguo Chen, Limin Wang, Chaofeng Hou, Ming Xu, Jinghai Li, Multi-Scale Continuum-Particle Simulation on CPU-GPU Hybrid Supercomputer in the Book "GPU Solutions to Multi-Scale Problems in Science and Engineering". Springer-Verlag Berlin/Heidelberg. 2013.

Research experiences

2015.1-Present: Postdoctoral Research Associate, Computer Science and Mathematics Division, Oak Ridge National Laboratory, United States (Mentors: Dr. C. Stuart Daw and Dr. Sreekanth Pannala)

- a) Main Participator, "*Computational Pyrolysis Consortium*", Collaborative Project among five national laboratories supported by Department of Energy, United States.
- b) Main Participator, "*Predictive Computational Catalysis*", Laboratory Directed Research Development Project supported by Department of Energy, United States.

2012.1-2014.12: Senior Technical Staff, Department of Mechanical Engineering, Iowa State University, United States

States (Mentors: Prof. Song-Charng Kong and Prof. Robert C. Brown)

- a) Co-Principal Investigator, “*Peta-scale High Fidelity Simulation of Atomization and Spray/Wall Interactions at High Temperature and Pressure Conditions*”, Frontier Project supported by Department of Defense, United States.
- b) Main Participant, “*Harnessing Renewable Energy*”, Iowa EPSCoR Project supported by National Science Foundation, United States.

2011.7~2011.12: Software Engineer, Astronomical Research Institute, University of Heidelberg, Germany

- a) Main Participant, “*Milky Way in Galactic System*”, SFB 881 Project supported by German Scientific Foundation, Germany.

2005.9~2011.6: Ph.D Candidate, Institute of Process Engineering, Chinese Academy of Sciences

- a) Main Participant, “*Multi-scale Numerical Simulation of Gas-solid Flows in Fluidization*”, General Project supported by Natural Science Foundation of China, China.
- b) Main Participant, “*Development of General Platform for Scientific Computing Based on General-Purpose Graphical Processing Unit*”, National Major Equipment Development Project supported by Ministry of Finance, China.
- c) Main Participant, “*SPH Modeling of Two-Fluid Model and Discrete Particle Model for Particle-Fluid Fluidization*”, General Project supported by Natural Science Foundation of China, China.
- d) Main Participant, “*Experimental Study on Fluidized-Bed Decoupling Gasification of Biomass*”, General Project supported by Natural Science Foundation of China, China.
- e) Main Participant, “*Numerical Simulation of Mixture Viscosity of Oil-Bead Suspensions in Channel Flow*”, Enterprise Commissioned Project supported by General Electrics Global Research Center, United States.
- f) Main Participant, “*High Performance Computing Software Development for GPU Scientific Computing*”, CUDA Center of Excellence Project supported by Nvidia Corporation, United States.

2001.9~2005.7: Bachelor Candidate, College of Material Science and Engineering, Wuhan University of Technology, China

- a) Summer Research, “*Preparation of Piezoelectricity Composite Material*”, General Project supported by Natural Science Foundation of China, China.

Teaching experiences

- a) Teaching assistant for the course “Physical Chemistry”, Wuhan University of Technology, fall 2003.
- b) Teaching assistant for the course “Transport Phenomena”, University of Chinese Academy of Sciences, fall 2005.
- c) Guest instructor for the course “Internal Combustion Engine Design”, Iowa State University, fall 2014.
- d) Presenter for the invited tutorial “Introduction of HPC Using OpenMP and CUDA”, ASME 2014 4th Joint US-European Fluids Engineering Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels.

Internships

- a) China Petrochemical Corporation, Yueyang, China, September 2004.
- b) Shanghai Supercomputing Center, Shanghai, China, July 2007.

Editorials

- a) **Associate Editor**, *International Journal of Energy & Technology*.
- b) **Review Editor**, *Frontiers in Energy Research*.
- c) **Lead Guest Editor**, *Special Issue “Multiscale Discrete Simulation of Complex Systems” in Discrete Dynamics in Nature and Society*.
- d) **Lead Guest Editor**, *Special Issue “Recent Progress in Studies of Pyrolysis Chemistry and Kinetics” in Current Organic Chemistry*.
- e) **Guest Editor**, *Special Issue “Numerical Simulation of Nano- and Micro-scale Heat Transfer” in International*

Journal of Physics.

- f) **Editorial Board Member**, *Academic Journals Online*.
- g) **Editorial Board Member**, *Journal of Engineering and Technology Research*.
- h) **Editorial Board Member**, *Trends Journal of Sciences Research*.
- i) **Editorial Board Member**, *American Journal of Mechanical Engineering*.
- j) **Editorial Board Member**, *Canadian Journal on Computing in Mathematics, Natural Sciences, Engineering and Medicine*.
- k) **Editorial Board Member**, *Research Open Journal of Mechanical Engineering in Science and Technology Publishing*.
- l) **Editorial Board Member**, *Research Open Journal of Civil Mechanical Engineering in Science and Technology Publishing*.

Professional services

Journal reviewer

Invited to review more than 300 manuscripts for peer-reviewed journals, such as *AIChE Journal*, *Applied Energy*, *Applied Thermal Engineering*, *ASME Transactions*, *Biomass Conversion and Biorefinery*, *Chaos*, *Chemical Engineering and Processing: Process Intensification*, *Chemical Engineering Journal*, *Chemical Engineering Science*, *Combustion and Flame*, *Computers & Chemical Engineering*, *Energy Conversion & Management*, *Environmental Progress & Sustainable Energy*, *European Transport Research Review*, *Journal of Environmental Chemical Engineering*, *Particuology*, *Powder Technology*.

Conference paper reviewer

Invited to review more than 100 technical papers for several international conferences, such as *ASME 2013 Summer Heat Transfer Conference*, *ASME 2013 Internal Combustion Engine Fall Technical Conference*, *ASME 2013/2014/2015 International Mechanical Engineering Congress & Exposition*, *ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting*.

Conference committee and chair

- a) Scientific committee member of the *Constructal Law and Second Law Conference 2015*.
- b) Co-organizer of Topic 9-5: Biomass & Biofuels, in *ASME 2013 International Mechanical Engineering Congress & Exposition*.
- c) Co-chair of session 9-5-1: Utilization and Combustion of Biomass and Biofuels, in *ASME 2013 International Mechanical Engineering Congress & Exposition*.
- d) Chair of session 9-5-2: Production and Utilization of Biomass and Biofuels, in *ASME 2013 International Mechanical Engineering Congress & Exposition*.
- e) Chair of session 3-9-6: Computational Modeling and Device Design, in *ASME 2013 International Mechanical Engineering Congress & Exposition*.
- f) Co-chair of session PFL204: Mixing-controlled CI Combustion—In-Cylinder Processes, in *SAE 2013 World Congress*.

Professional society membership

- a) American Institute of Chemical Engineers (AIChE).
- b) American Society of Mechanical Engineers (ASME).

Officer position

- a) Vice president, Students Union of the Department of Material Science and Technology, Wuhan University of Technology, 2003-2004 academic year.

Invited talks

- a) Convergent Science, Inc., December 19, 2014, Madison, United States.
- b) Department of Mathematics, Iowa State University, May 8, 2014, Ames, United States.

- c) Department of Mathematics, Texas A&M University, May 27-30, 2013, College Station, United States.
- d) Kavli Institute of Astrophysics and Astronomy, Peking University, March 25, 2011, Beijing, China.

Research skills

- a) Expert at computational fluid dynamics using grid-based and mesh-free numerical methods, such as finite difference method, finite volume method, boundary integral method, lattice Boltzmann method, molecular dynamics, dissipative particle dynamics, hard sphere modeling, smoothed particle hydrodynamics, and discrete element method.
- b) Having fairly good knowledge of direct numerical simulation, discrete particle modeling, multi-fluid model, adaptive mesh refinement, Reynolds average Navier-Stokes, large-eddy simulation, heat and mass transfer, and chemical reactions.
- c) Ten year experience in C/C++, Fortran, parallel computing (MPI, OpenMP), and graphical programming using CUDA for computing and OpenGL for visualization. Four year experience in OpenFOAM and Fluent, and three year experience in MFIK and KIVA. Good at GPU and CPU cluster installation, maintenance and management.
- d) Four year experience in writing research proposals and scientific reports.
- e) Having fairly good knowledge of experimental design and measurement of fixed-bed catalytic flow, gas-solid fluidizations, and catalyst synthesis.