

# Curriculum Vitae

## PERSONAL DATA

Name: Shuyu Sun  
Born: September 1971, China  
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<http://www.kaust.edu.sa/shuyusun>

## RESEARCH INTERESTS

- 1) Finite element methods (in particular, adaptive discontinuous Galerkin methods for flow and reactive transport problems in porous media) and numerical analysis (*a priori* and *a posteriori* error estimation)
- 2) Numerical oil reservoir simulations and computational transport phenomena
- 3) Computational thermodynamics of reservoir fluids
- 4) Other interests: computational and mathematical biology (simulation and modeling of growth factor-induced angiogenesis); computational and mathematical modeling of supply chains

## EDUCATION

- ◆ **Doctor of Philosophy (Ph.D.), Computational and Applied Mathematics** (August 2003)  
GPA: 4.0/4.0  
Institute for Computational Engineering and Sciences, The University of Texas at Austin  
Specialization: Finite Element Methods for Flow and Transport  
Thesis advisor: Prof. Dr. Mary F. Wheeler, *member of U.S. National Academy of Engineering*
- ◆ **Master of Science, Computational and Applied Mathematics** (December 2002)  
GPA: 4.0/4.0  
Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin  
Specialization: Finite Element Methods for Flow and Transport
- ◆ **Doctor of Engineering (D.Eng.), Chemical Engineering** (October 1997)  
Chemical Engineering Research Center, Tianjin University, China  
Specialization: Mass Transfer and Separation Engineering  
Thesis advisor: Prof. Dr. Guochong (K. T.) Yu, *member (academician) of Chinese Academy of Sciences*
- ◆ **Master of Engineering, Chemical Engineering** (May 1994)  
Department of Chemical Engineering, Tianjin University, China  
Specialization: Mass Transfer and Separation Engineering
- ◆ **Bachelor of Engineering, Industrial Chemistry** (July 1991)  
Department of Chemical Engineering, Tianjin University, China

## PROFESSIONAL/BOARD CERTIFICATION

- ◆ **Licensed Professional Engineer (P.E.)** (Texas License No. 94569, December 15, 2004 – Present)

Passed the FE and PE (chemical engineering) exams in 2004.

- ◆ **SPEC, i.e. SPE Certification** (November 2010 – Present)  
Achieved the certification under the SPE Petroleum Engineering Certification Program.  
(SPE is the Society of Petroleum Engineers)
- ◆ **Sun Certified Programmer for the Java 2 Platform** (January 25, 2003 – January 25, 2005)

## PROFESSIONAL EXPERIENCE

### *Primary Positions*

- ◆ **Associate Professor of Applied Math & Computational Science (AMCS)** (Oct 1, 2012 – Present)  
*Division of Computer, Electrical & Mathematical Sciences & Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia*
- ◆ **Associate Professor of Earth Science and Engineering (ErSE)** (Oct 1, 2012 – Present)  
*Division of Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia*
- ◆ **Assistant Professor of AMCS and ErSE** (August 2009 – September 2011)  
*King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia*
- ◆ **Assistant Professor of Mathematical Sciences** (August 2006 – August 2010)  
*Department of Mathematical Sciences, Clemson University, Clemson, South Carolina*  
(On leave of absence during August 2009 – August 2010)
- ◆ **Research Associate** (February 2005 – August 2006)  
*Center for Subsurface Modeling, Institute for Computational Engineering and Sciences, The University of Texas at Austin*
- ◆ **Postdoctoral Fellow** (September 2003 – January 2005)  
*Institute for Computational Engineering and Sciences, The University of Texas at Austin*
- ◆ **Research Assistant** (September 1999 – August 2003)  
*Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin*

### *Guest or Adjunct Positions*

- ◆ **Adjunct Associate Professor** (July 2011 – Present)  
*Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, USA*
- ◆ **Adjunct Professor (兼职教授 博士生导师)** (March 2010 – Present)  
*College of Science, Xi'an Jiao Tong University, Xi'an, China*
- ◆ **Adjunct Professor (兼职研究生导师)** (June 2012 – Present)  
*China University of Petroleum at Beijing, China*

### *Short-Term Visiting Positions*

- ◆ **Visiting Scholar** (July 3 – July 15, 2013)  
*Department of Informatics, TUM (Technische Universität München)  
Boltzmannstrasse 3, D-85748 Garching, Germany*

- ◆ **Visiting Scholar** (December 5 – December 13, 2012)  
*Oxford Centre for Collaborative Applied Mathematics (OCCAM), Mathematical Institute, Oxford University, United Kingdom*
- ◆ **Visiting Scholar** (June 15 – July 17, 2012)  
*Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong*
- ◆ **Visiting Scholar** (June 19 – July 19, 2011)  
*Department of Mechanical Engineering, Stanford University, Palo Alto, California, USA*
- ◆ **Research Scientist** (April 30 – May 31, 2009, and May 31 – June 30, 2010)  
*Reservoir Engineering Research Institute (RERI), Palo Alto, California, USA*
- ◆ **Oden Faculty Research Fellow** (July 15 – August 15, 2008 and July 6 – August 7, 2009)  
(Supported by J. T. Oden Faculty Fellowship Research Program)  
*Institute for Computational Engineering and Sciences, The University of Texas at Austin*
- ◆ **Visiting Scholar** (July 23 – August 8, 2007)  
*School of Mathematical Sciences, Peking University, China*
- ◆ **Visiting Scholar** (May 14 – July 14, 2007)  
*School of Chemical Engineering, Tianjin University, China*
- ◆ **Visiting Scholar** (December 20, 2006 – January 8, 2007)  
*Department of Mathematics, National Taiwan University, Taipei, Taiwan*

## TEACHING EXPERIENCE

### Classes Taught at King Abdullah University of Science and Technology (KAUST)

Spring 2015:	ErSE 30? (Numerical methods in subsurface flow and transport) (planned)
Fall 2014:	ErSE 209/309 (Thermodynamics of Subsurface Reservoirs) (planned)
Spring 2014:	ErSE 305 (Multiphase Flows in Porous Media) (planned)
Fall 2013:	ErSE 202 (Computational Groundwater Hydrology)
Spring 2013:	ErSE 209/309 (Thermodynamics of Subsurface Reservoirs)
Fall 2012:	ErSE 305 (Multiphase Flows in Porous Media)
Spring 2012:	ErSE 202 (Computational Groundwater Hydrology)
Fall 2011:	ErSE 209/309 (Thermodynamics of Subsurface Reservoirs)
Spring 2011:	ErSE 202 (Computational Groundwater Hydrology)
Fall 2010:	ErSE 305 (Multiphase Flows in Porous Media)
Spring 2010:	ErSE 202/EnSE 224 (Computational Groundwater Hydrology)
Fall 2009:	AMCS 201 (Applied Mathematics I) (assisting David Keyes)
	ErSE 216 (Inverse Problems) (jointly taught with Ibrahim Hoteit)

### Supervision of Postdoctoral Fellows and Research Scientists at KAUST (Current)

Hua Zhong	Postdoctoral Fellow, October 15, 2013 – Present
Kai Bao	Postdoctoral Fellow (Joint with HKUST), September 15, 2010 – Present
Mohamed F. ElAmin	Research Scientist, October 1, 2013 – Present
Amgad Salama	Research Associate, January 15, 2011 – Present

### Supervision of Postdoctoral Fellows at KAUST (Past)

Mohamed F. ElAmin	Postdoctoral Research Fellow, October 1, 2009 – September 30, 2013
Yi Wang	Postdoctoral Fellow, September 1, 2012 – August 31, 2013
Jie Chen	Postdoctoral Fellow (Joint with HKUST), Sept 1, 2010 – Feb 14, 2013

Huancong Huang	Postdoctoral Research Fellow, March 31, 2011 – January 5, 2012
Jun Li	Postdoc Research Fellow (Joint w Victor Calo), Dec 15, 2010 – Dec 2011
Jisheng Kou	Postdoctoral Research Fellow, December 1, 2009 – Dec 2011
Chuanxiu Xu	Postdoctoral Research Fellow, October 1, 2009 – September 30, 2010

#### Supervision of PhD Students at KAUST as Thesis Advisor

Xiaolin Fan	Earth Science and Engineering, August 2013 – Present
Sahar Amir	Earth Science and Engineering, August 2013 – Present
Klemens Katterbauer	Earth Science and Engineering, May 2013 – Present (Joint w I. Hoteit)
Ardiansyah Negara	Earth Science and Engineering, June 2011 – Present
Ahmad Kadoura	Earth Science and Engineering, June 2011 – Present
Rebecca Allen	Earth Science and Engineering, May 2011 – Present
Yuanqing Wu	Computer Science, September 1, 2010 – Present

#### Supervision of Master's Students at KAUST as Thesis Advisor

Ibrahim Gawish	Earth Science and Engineering, Sept 2012 – Present
Sultan Safin	Earth Science and Engineering, Sept 2012 – Present
Sahar Amir	Computer Science, September 1, 2011 – August 2013
Zhiwei Ma	Earth Science and Engineering, Sept 2011 – August 2013
Sebastian Saavedra	Earth Science and Engineering, Sept 2010 – August 2012 Thesis: “A finite difference, IMPEC, equation-of-state efficient algorithm for the compositional flow modeling in the subsurface”, defended in Room 3422, Building 1, KAUST, 4:30-5:30pm, July 4, 2012 (Thesis committee members: S. Sun, Victor Calo, and Zhiping Lai) First position after graduation: Engineer, Saudi Arabian Oil Company
Shouhong Du	Applied Mathematics and Computational Science, Sept 2010 – June 2012 Thesis: “Monte Carlo molecular simulation with isobaric-isothermal and Gibbs-NPT ensembles”, defended in Room 3422, Building 1, KAUST, 11:00am, May 2, 2012 (Thesis committee members: S. Sun, Zhiping Lai, and Ying Wu) First position after graduation: Engineer, Saudi Arabian Oil Company
Hossam O. Osman	Earth Science and Engineering, Sept 2010 – May 2012 Thesis: “A finite difference, multipoint flux numerical approach to flow in porous media”, defended in Room 3422, Building 1, KAUST, 1:00pm, April 16, 2012 (Thesis committee members: S. Sun, Georgiy Stenchikov, and Ibrahim Hoteit) First position after graduation: Engineer, Saudi Arabian Oil Company
Ardiansyah Negara	Earth Science and Engineering, Sept 2009 – June 2011 Thesis: “Simulation of CO <sub>2</sub> injection in porous media with structural deformation effect”, defended in Room 3119, Building 1, KAUST, 10:00-11:00am, June 18, 2011 (Thesis committee members: S. Sun, Victor Calo, and Zhiping Lai) First position after graduation: PhD student, KAUST
Ahmad Kadoura	Chemical and Biological Engineering, Sept 2009 – June 2011 Thesis: “Study of Monte Carlo simulation method for methane phase diagram prediction using two different potential models”, defended in Room 3422, Building 1, KAUST, 8:30-9:30am, June 18, 2011 (Thesis committee members: S. Sun, Klaus-Viktor Peinemann, and Zhiping Lai) First position after graduation: PhD student, KAUST
Rebecca Allen	Environmental Science and Engineering, Sept 2009 – May 2011 Thesis: “CO <sub>2</sub> sequestration in saline aquifers: modeling diffusive and convective transport of a CO <sub>2</sub> cap”, defended in Room 4418, Building 1, KAUST, 2:00-3:00pm, May 11, 2011 (Thesis committee members: S. Sun, Georgiy Stenchikov, and Peng Wang) First position after graduation: PhD student, KAUST
Mohamad Elgharamti	Earth Science and Engineering, Sept 2009 – Dec 2010 (w Ibrahim Hoteit) Thesis: “Low-rank Kalman filtering in subsurface contaminant transport models”, defended in Room 3422, Building 1, KAUST, 4:00pm, December 13, 2010 (Thesis committee members: S. Sun, Ibrahim Hoteit, and Georgiy Stenchikov) First position after graduation: PhD student, KAUST

**Supervision of Graduate Students at KAUST as Instructor of Directed Research**

Ibrahim Gawish	Fall semester, 2012
Sultan Safin	Fall semester, 2012
Zhiwei Ma	Spring semester, 2012
Sebastian Saavedra	ErSE 299H, Fall semester, 2011
Waqas Ahmed Khan	ErSE 299H, Spring semester, 2011
Sebastian Saavedra	ErSE 299H, Spring semester, 2011
Keyang Dai	AMCS 299, Fall semester, 2010
Guilherme Blaitterman Ribeiro Jr	ErSE 299, Fall semester, 2010
Wenhui Wang	ErSE 399B, Spring semester, 2010
Guilherme Blaitterman Ribeiro Jr	ErSE 299A, Spring semester, 2010
Mohamad Elgharamti	ErSE 299A, Spring semester, 2010
Ardiansyah Negara	ErSE 299A, Spring semester, 2010

**Supervision of Graduate Students at KAUST as Research Project Supervisor**

Zhiling Tang

Graduate student in Computer Science, KAUST, Sept 1, 2009 – Dec 15, 2011

Research topic: Parallel computation of fluid property & fluid flow in subsurface reservoirs

First position after graduation: Engineer, Saudi Arabian Oil Company

**Serving Thesis Committees at KAUST (excluding as Thesis Advisor)**

Lulu Liu	PhD student in Applied Mathematics and Computational Science
Ali Al-Shehri	PhD student in Chemical and Biological Engineering (?)
Ge Zhan	PhD student in Earth Science and Engineering Thesis: “Reverse-time migration in tilted transversely isotropic media with decoupled equations”, defended in Room 3119, Building 1, KAUST, 4:00-6:00pm, Tuesday December 11, 2012 (Thesis committee members: Gerard Schuster, Ying Wu, and S. Sun)
Beshir Aman	Master’s student in Earth Science and Engineering Thesis: “Reservoir history matching using ensemble Kalman filters with anamorphosis transforms”, defended in Room 3422, Building 1, KAUST, 11:00am-12:30pm, Sunday December 9, 2012 (Thesis committee members: Ibrahim Hoteit, Tareq AlNaffouri, Marco Scavino, and S. Sun)
Wei Dai	PhD student in Earth Science and Engineering Thesis: “Multisource least-squares reverse time migration”, defended in Room 3119, Building 1, KAUST, 4:30-6:00pm, Saturday November 24, 2012 (Thesis committee members: Gerard Schuster, Martin Mai, Ying Wu, and S. Sun)
Pedro Moy	Master’s student in Earth Science and Engineering Thesis: “Performance analysis of high-order numerical methods for time-dependent acoustic field modeling”, defended in Room 3422, Building 1, KAUST, 3:00-4:30pm, Monday July 30, 2012 (Thesis committee members: Victor M. Calo, Yalchin Effendiev, and S. Sun)
Chandra Prasetyo	Master’s student in Computer Science Thesis: “The hybrid of classification tree and extreme learning machine for permeability prediction in oil reservoir”, defended in Conf. Room 4214, Building 1, KAUST, 2:00-3:00pm, June 18, 2011 (Thesis committee members: Mikhail Moshkov, Basem Shihada, and S. Sun)

**Serving PhD Qualifying Examination Committees at KAUST**

Rebecca Allen	PhD student in ErSE, took exam November 20, 2012
Jerry Raj	PhD student in ErSE, took exam 2-4pm October 2, 2012
Ardiansyah Negara	PhD student in ErSE, took exam on September 4, 2012
Yuanqing Wu	PhD student in CS, took exam on May 19, 2012
Ahmad Kadoura	PhD student in ErSE, took exam on May 6, 2012
Mohamad Elgharamti	PhD student in ErSE, took exam on February 13, 2012
Xuxin Ma	PhD student in ErSE, took exam in October 2011
Ge Zhan	PhD student in ErSE, took exam in May 2011

Xin Wang	PhD student in ErSE, took exam in April 2011
Sanzong Zhang	PhD student in ErSE, took exam in April 2011
Wei Dai	PhD student in ErSE, took exam in April 2011

#### **Supervision of Graduate Students at KAUST as Faculty Supervisor of Internship**

Rebecca Allen	Summer 2012 (OCCAM, University of Oxford, UK)
Zhiwei Ma	Summer 2012 (King Fahd Univ of Petroleum & Minerals)
Ardiansyah Negara	Summer 2012 (Saudi Aramco Oil Company, Dhahran)
Waqas Khan	Summer 2011 (Schlumberger Oil Company, Dhahran)
Sebastian Saavedra	Summer 2011 (PEMEX, Mexico Oil Company)
Rayan Alghanim	Summer 2011 (Saudi Aramco Oil Company, Dhahran)
Massab Junaid	Summer 2011 (Engro Fertilizers, previously Exxon Mobil)
Lautaro Rayo	Summer 2011 (Schlumberger Oil Field Plc., Abingdon, UK)
Hossam Osman	Summer 2011 (Saudi Aramco Oil Company, Dhahran)
Ardiansyah Negara	Summer 2011 (Colorado State University, Fort Collins)
Guilherme Blaitterman Ribeiro Jr	Summer 2010 (University of Calgary, Canada)
Mohamad Elgharamti	Summer 2010 (University of Texas at Austin)
Ardiansyah Negara	Summer 2010 (Schlumberger Oil Company)

#### **Classes Taught at Clemson University**

Spring 2009:	MthSc 866 (Introduction to Finite Element Methods) MthSc 499 (Creative Inquiry: MACOBE)
Fall 2008:	MthSc 860 (Introduction to Scientific Computing) MthSc 499 (Creative Inquiry: MACOBE) MthSc 360 (Intermediate Mathematical Computing)
Spring 2008:	MthSc 360 (Intermediate Mathematical Computing)
Fall 2007:	MthSc 860 (Introduction to Scientific Computing) MthSc 360 (Computer Analysis in Engineering)
Spring 2007:	MthSc 460/660 (Introduction to Numerical Analysis)
Fall 2006:	MthSc 208 (Introduction to Ordinary Differential Equations)

#### **Supervision of Graduate Students at Clemson University as Thesis Advisor**

Thilo Strauss	PhD student in mathematics, co-advised with Prof. Taufiqar Khan, 2011 – Present.
Vy Tran	PhD student in computational mathematics, co-advised with Prof. Chris Cox, 2007 – Present.
Pu Song	Master's student in computational mathematics. 2008 – 2010. Thesis: "Contaminant flow and transport simulation in cracked porous media using locally conservative schemes", defended in Martin Hall M301, Clemson University, 9:00-10:00am, July 21, 2010. (Thesis committee members: S. Sun, Leo Rebholz, and Jeong-Rock Yoon) First position after graduation: PhD student, University of Pittsburgh, USA
Chen Dong	Master's student in computational mathematics. 2008 – 2010. Thesis: "Numerical modeling of contaminant transport in fractured porous media using mixed finite element and finite volume methods", defended in Martin Hall M301, Clemson University, 9:00-10:00am, July 19, 2010. (Thesis committee members: S. Sun, Vincent Ervin, and Eleanor Jenkins) First position after graduation: PhD student, University of Maryland, College Park, USA

#### **Supervision of Graduate Students at Clemson University as Research Project Supervisor**

Jiayu Zhang	Graduate student in math (RA on multiscale angiogenesis modeling). 2007.
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#### **Serving Thesis Committees at Clemson University (excluding as Thesis Advisor)**

Ricky Farr	Master's student in mathematics.
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Thesis: “Approximation of fractional advection dispersion equations by hierarchical matrix methods”, defended in Martin Hall 0-10, Clemson University, 10:30 am, July 13, 2009.  
(Thesis committee members: Vincent Ervin, Chris Cox, and S. Sun)

#### **Supervision of Undergraduate Students at Clemson University as Research Project Supervisor**

Meaghan Riemer Undergraduate student in math (Creative inquiry project on neuron growth; co-advised with Prof. Delphine Dean). 2007 - 2010.  
Courtney Taylor Undergraduate student in bioengineering (Creative inquiry project on neuron growth; co-advised with Prof. Delphine Dean). 2009 - 2010.

#### **Supervision of Graduate Students at Other Universities as Thesis Advisor**

Jiangyong Hou (侯江勇) PhD student in math, Xi’an Jiaotong University  
Co-advised with Prof. Zhangxing Chen, September 2010 – Present  
Xiaolin Fan (范小林) Master’s student in mathematics, Guizhou University, China,  
co-advised with Dean & Prof. Wei Wei, September 2009 – June 2011.  
Thesis: “Mathematical models and numerical simulation of flow processes in Karst aquifers”,  
defended in Guizhou University, Guiyang, 9:00 am, Tuesday June 7, 2011.  
(Thesis committee members: Wei Wei, S. Sun, Fu-Rong Xu, Yi-Du Yang, Ming Zhao, Hui  
Yang, and Min-Qing Gong)  
First position after graduation: Lecturer, Guizhou Medical College, Guiyang, China

#### **Serving as external examiner of PhD thesis at Nanyang Technological University**

Jie Chen PhD candidate, School of Physical and Mathematical Sciences, NTU  
Thesis: “Linear finite element superconvergence on simplicial meshes”, 2011.

### **SPONSORED RESEARCH**

- 1) Lead PI (Lead Principal Investigator) at KAUST side, “Micro/nanofluidics”, the one-year extension of the award for research collaboration between HKUST (Hong Kong University of Science and Technology) and KAUST, funded by KAUST’s Special Academic Partnership Program, September 1, 2013 – August 31, 2014 (Lead PI at KAUST: S. Sun; other PI’s at KAUST: Jurgen Kosel, Ian Foulds, Peng Wang; Lead PI at HKUST: Weijia Wen, other PI’s at HKUST: Ping Sheng, Xiao-Ping Wang, Tiezheng Qian, Yi-Kuen Lee, and Wenjing Ye).
- 2) Principal Investigator, “New Electro-Magneto-Mechano Processes for Non-invasive Interior Healing of Damaged Piping Systems”, funded by KAUST’s OCRF Program, (PID number: 7000000098), July 1, 2013 – June 30, 2014 (P.I. at KAUST: S. Sun, P.I. at University of California at Berkeley: Tarek I. Zohdi). Grant amount: US\$300,000.00 (KAUST side) and US\$300,000.00 (UC-Berkeley side).
- 3) Principal Investigator, “High Performance Visual Computing”, funded by KAUST’s OCRF Program, October 1, 2012 – September 30, 2014 (P.I. at KAUST: S. Sun, P.I. at TUM (Technische Universität München): Hans-Joachim Bungartz). Grant amount: US\$353,000.00 (KAUST side) and US\$ 1,588,436.07 (TUM side).
- 4) Principal Investigator, “Simulation of Subsurface Geochemical Transport and Carbon Sequestration”, funded by KAUST’s GRP-AEA Program, September 1, 2011 – August 31, 2015 (P.I. at KAUST: S. Sun, P.I. at UT-Austin: M. F. Wheeler; Co-P.I.: I. Hoteit, and T. Arbogast, and M. Hesse). Grant amount: US\$3,001,331.92 (Grant to KAUST side: US\$1,200,070.00).
- 5) Co-Principal Investigator, “Multi-scale, multi- physics simulation and uncertainty quantification for porous media processes and applications (MMUPA)”, funded by KAUST Strategic Research Initiative (SRI) competitive funding program. (P.I. at Texas A&M: Yalchin Efendiev; P.I. at KAUST: Victor M. Calo).
- 6) Principal Investigator, "Parallel Multiscale Simulation of Multicomponent Multiphase Flow: From Darcy Scale to Molecular Scale", funded by KAUST’s GRP University Research Funds (URF)

- KAUST-IBM Program, January 9, 2012 – January 8, 2013. (P.I. at KAUST: S. Sun, P.I. at IBM: K. Jordan). Grant amount: US\$325,000.00 (Total project budget US\$650,000.00).
- 7) Principal Investigator, “Evaluation of Sulfur Solubility in Natural Gas with Molecular Simulation”, funded by Saudi Aramco Oil Company (Contract #: 6600024505; REL PO #: 6510454094; Pocket ID: 3000000121), January 15, 2011 – January 14, 2013. Grant amount: US\$399,372.
  - 8) Co-Principal Investigator, Center for Subsurface Imaging and Fluid Modeling consortium (CSIM), Industrial Affiliates Program for Oil Companies, (P.I.: Gerard Schuster), September 2010 — September 2011. Grant amount: US\$200,000 (with US\$25,000 from each of 8 oil companies consisting of British Petroleum, Chevron, Total, WesternGeco, Tullow, PEMEX, Saudi Aramco, and Petrobras).
  - 9) Principal Investigator, “The Modeling and Simulation of Two-Phase Flow in Porous Media: From Pore Scale to Darcy Scale”, funded by KAUST’s GRP-CF (Global Research Partnership Collaborative Fellows) Program to support one postdoctoral collaborative fellow jointly hired by KAUST and HKUST, January 5, 2011 – January 4, 2014. Grant amount: US\$61,250 (Shuyu Sun at KAUST) and about HK\$600,000 (Xiao-Ping Wang at HKUST).
  - 10) Principal Investigator, “Study of Sulfur Solubility using Thermodynamics Model and Quantum Chemistry”, funded by KACST (the Saudi Arabian national science agency, equivalent to NSF in US), August 30, 2011 – August 29, 2012. Grant amount: SAR 185,000.
  - 11) Principal Investigator, “Modeling Multi-Component Phase Equilibrium of Reservoir Fluids with Molecular Simulation”, funded by Saudi Aramco Oil Company, (Project #: 3000000001; Pocket ID: 3000000021; CRPO #: 6510435957), July 12, 2010 – July 11, 2012. Grant amount: US\$334,200.
  - 12) Co-Principal Investigator, Center for Subsurface Imaging and Fluid Modeling consortium (CSIM), Industrial Affiliates Program for Oil Companies, (P.I.: Gerard Schuster), September 2009 — September 2010. Grant amount: about US\$150,000.
  - 13) Principal Investigator, KAUST faculty Baseline Research Fund (BRF), funded by KAUST, August 2009 – August 2014. Grant amount: US\$2,000,000.
  - 14) Principal Investigator, “Proof-of-Concept Model for the Cementitious Barrier Partnership”, funded by U.S. Department of Energy through SCUREF – Savannah River National Laboratory, May 2009 – August 2010. Grant amount: US\$105,776.
  - 15) Co-Principal Investigator, “Multi-scale Modeling, Analysis and Optimization of Energy Supply Chains,” funded by National Science Foundation of China (contract number: 70871077), January 2009 – December 2011, (P.I.: Ming Dong). Grant amount: 249,000 RMB.
  - 16) Co-Principal Investigator, “Multi-Scale Modeling and Optimization for Distributed Multi-Entrant Complex Manufacturing Systems,” funded by National High-Tech Research and Development Program (863 Program) of China (contract number: 2008AA04Z104), January 2008 – December 2010, (P.I.: Ming Dong). Grant amount: 640,000 RMB.
  - 17) Principal Investigator, “*In Silico* Modeling of Tissue Angiogenesis,” funded by Research Grant Committee, Clemson University, December 2006 – August 2007. Grant amount: US\$3,325.
  - 18) Principal Investigator, “MACOBE: Mathematical Modeling of Neuron Cell Growth,” funded by Creative Inquiry Projects Committee, Clemson University, August 2007 – August 2010. (P.I.’s: Delphine Dean and S. Sun).
  - 19) Principal Investigator, Clemson University faculty start-up research grant, funded by Clemson University, August 2006 – August 2008. Grant amount: US\$45,959.
  - 20) Investigator, “Computational Modeling of Angiogenesis,” University of Texas M. D. Anderson Biomedical Engineering Seed Grant, September 2003 – September 2004, (P.I.: Mary F. Wheeler). Grant amount: US\$10,000.



- 21) Investigator, “Focused Effort on Error Estimators/Indicators for Environmental Quality Modeling”, funded by U.S. Department of Defense (High Performance Computing Modernization Program), (P.I.: Mary F. Wheeler), September 2002 – September 2003. Grant amount: US\$139,625.
- 22) Investigator, “A Data Intense Challenge: the Instrumented Oilfield of the Future,” funded by U.S. National Science Foundation (Information Technology Research program), 2001-2002, (P.I.: Mary F. Wheeler). Grant amount: US\$2,150,000 (\$260,000 for Wheeler’s team).
- 23) Investigator, “Coupling of Models for Energy and Environment,” NPACI Alpha Project, funded by NPACI of U.S., 2001 – 2002, (P.I.: Mary F. Wheeler). Grant amount: US\$290,000.

## EDITORIAL SERVICE

- 1) Guest Editor (guest editing with Professor Ivan Yotov), a special issue of CMAME (*Computer Methods in Applied Mechanics and Engineering*) on “Advances in Simulations of Subsurface Flow and Transport”, 2013 – 2014. | Journal website: <http://www.journals.elsevier.com/computer-methods-in-applied-mechanics-and-engineering/>
- 2) Editor-in-Chief (with Professor Zhangxing John Chen), *Modeling and Computation for Flow and Transport (MCFT)*, September 2010 – Present. | Journal ISSN: 2210-7061; Journal website: <http://www.bentham.org/open/mcft/>
- 3) Guest Editor (guest editing with Professors B. Yu, T. Kunugi, T. Tagawa, M. Wang, and Y. Wang), Advances in Mechanical Engineering special issue on “Numerical Simulation of Fluid Flow and Heat Transfer Processes”, 2012 – 2013. | Journal ISSN: 1687-8132 (Print), ISSN: 1687-8140 (Online); Journal website: <http://dx.doi.org/10.1155/5263>
- 4) Lead Guest Editor (guest editing with Professors Zhangxing John Chen, Hiroshi Kanayama, and Mohamed F. El-Amin), Journal of Applied Mathematics special issue on “Mathematical and Numerical Modeling of Flow and Transport 2012”, 2011 – 2012. | Journal ISSN: 1110-757X, E-ISSN: 1687-0042; Journal website: <http://dx.doi.org/10.1155/4185>
- 5) Lead Guest Editor (guest editing with Professors Zhangxing John Chen, Lea Jenkins, and Juergen Geiser), Journal of Applied Mathematics special issue on “Mathematical and Numerical Modeling of Flow and Transport”, 2010 – 2011. | Journal ISSN: 1110-757X, E-ISSN: 1687-0042; Journal website: <http://dx.doi.org/10.1155/4185>
- 6) Associate Editor, *Advances in Applied Mathematics and Mechanics (AAMM)*, April 2010 – Present. | Journal ISSN: 2070-0733, E-ISSN: 2075-1354; Journal website: <http://www.global-sci.org/aamm/>
- 7) Associate Editor, *Journal of Statistics and Mathematics*, September 2010 – Present. | Journal ISSN: 0976-8807, E-ISSN: 0976-8815; Journal website: <http://www.bioinfo.in/contents.php?id=85>
- 8) Member of Editorial Board, *International Journal of Numerical Analysis & Modeling, Series B (IJNAMB)*, February 2010 – Present. | Journal ISSN: 1923-2950, E-ISSN: 1923-2950; Journal website: <http://www.math.ualberta.ca/ijnamb/>
- 9) Member of Editorial Board, *Journal of Waste Water Treatment and Analysis*, November 2010 – Present. Journal website: <http://omicsonline.org/jwwtathome.php>
- 10) Member of Editorial Board, *ISRN (International Scholarly Research Network) Applied Mathematics*, May 2011 – Present. Journal website: <http://www.hindawi.com/isrn/appmath/>

## HONORS, AWARDS AND RECOGNITIONS

Certification from SPE recognizing him as “serving exceptionally well as Student Chapter Faculty Advisor” for KAUST Student Chapter, July 26, 2013.  
 J. T. Oden Research Faculty Fellowship recipient, The University of Texas at Austin, 2008 and 2009  
 Congress Fellowship, U.S. National Congress on Computational Mechanics, 2005  
 Best paper award, International Conf. on Computing, Communication and Control Technologies, 2005  
 NSF fellowship for the NSF Summer Institute on Nano Mechanics and Materials, June 20 – 24, 2005  
 Nominations for Burroughs Wellcome Career Awards at the Scientific Interface, The University of Texas at Austin, 2004 and 2005  
 Postdoctoral Fellowship, The University of Texas at Austin, 2003 – 2005  
 Full member (elected), Sigma Xi (the Scientific Research Society), 2003 – Present  
 Member, Tau Beta Pi (the Engineering Honor Society), 2003 – Present  
 Member, the Honor Society of Gamma Beta Phi, 2003 – Present  
 Research Assistantship, The University of Texas at Austin, 1999 – 2003  
 University of Texas Fellowship, The University of Texas at Austin, 1999 – 2000  
 Member, the Honor Society of Phi Kappa Phi, 1999 – Present  
 First-class Wang Kechang Scholarship, Tianjin University, China, 1996  
 Best Master’s Thesis Award, Tianjin University, China, 1994  
 University Awards for Best Academic Performance, Tianjin University, China, 1990 and 1993  
 Best Undergraduate Thesis Award, Tianjin University, China, 1991

### Select Recognitions on Publication:

- 1) Our paper entitled “Compatible algorithms for coupled flow and transport” has been cited 99 times as of April 2010 according to Google Scholar.
- 2) Our paper entitled "Symmetric and nonsymmetric discontinuous Galerkin methods for reactive transport in porous media" has been cited 48 times as of April 2010 according to Google Scholar.
- 3) As of November 1, 2009, our paper entitled “Compatible algorithms for coupled flow and transport” has been among the list of the 50 most cited articles in *Computer Methods in Applied Mechanics and Engineering* from 2004-2008 (rank No. 6).
- 4) Our paper entitled “A locally conservative finite element method based on enrichment of the continuous Galerkin method” has been among the list of Top 20 Most Downloaded Articles in *SIAM Journal on Scientific Computing* in the months of June, July and August 2009 (rank No. 4 in July 2009).
- 5) Our paper entitled “Coupled generalized non-linear stokes flow with flow through a porous medium” has been among the list of Top 20 Most Downloaded Articles in *SIAM Journal on Numerical Analysis* in the months of March and April 2009.
- 6) Our paper entitled “Coupling discontinuous Galerkin and mixed finite element discretizations using mortar finite elements” has been among the list of Top 20 Most Downloaded Articles in *SIAM Journal on Numerical Analysis* in the month of March 2008 (rank No. 3).

## CONFERENCES / WORKSHOPS / MINISYMPOSIUMS ORGANIZED

- 1 Chair (with Jiangguo James Liu), *International Workshop on Flow and Transport: Modeling, Simulations and Algorithms*, within the International Conference on Computational Science (ICCS 2013), Barcelona, Spain, June 5 - June 7, 2013.
- 2 Member, Organizing Committee, Symposium on Geophysical Flows (地球物理流动学研讨会), Xi’an Jiaotong University, Xi’an, China, July 22-24, 2012.
- 3 Chair (with Jiangguo James Liu), *International Workshop on Flow and Transport: Modeling, Simulations and Algorithms*, within the International Conference on Computational Science (ICCS 2011), Omaha, Nebraska, USA, June 4 – 6, 2012.
- 4 Co-Chair (with Taufiqar Khan), the minisymposium of “Computational Challenges in Statistical Inverse Problems Arising in Applications”, the Conference of *Inverse Problems: Modeling and Simulation 2012*, Antalya, Turkey, May 21 – 26, 2012.

- 5 Chair (with Jiangguo James Liu), *International Workshop on Flow and Transport: Computational Challenges*, within the International Conference on Computational Science (ICCS 2011), Nanyang Technological University, Singapore, June 1 - June 3, 2011.
- 6 Chair (with Ibrahim Hoteit), the minisymposium of “Simulation, Optimization and Assimilation of Subsurface Reservoirs” in the 2011 SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS11), Long Beach, California, March 21-24, 2011.
- 7 Organizer, the 2010 KAUST WEP Workshop (WE 245) on “Advanced Finite Element Methods with Applications in Numerical Reservoir Simulation”, Building 9, Room 4125, KAUST, Thuwal, Saudi Arabia, January 30 - February 1, 2010. | Invited speakers include Mary Wheeler (UT-Austin), Tao Tang (Hong Kong Baptist Univ), Ivan Yotov (U of Pittsburgh), Todd Arbogast (UT-Austin), Zhangxing (John) Chen (University of Calgary), and Guangri (Gary) Xue (UT-Austin); Workshop webpage at <http://web.kaust.edu.sa/faculty/shuyusun/FEM2010>
- 8 Chair (with Lea Jenkins) the minisymposium of “Computational issues in porous media flows” in the 33rd SIAM Southeastern-Atlantic Section Annual Meeting, University of South Carolina, Columbia, South Carolina, April 4-5, 2009.
- 9 Organizer, Computational Mathematics Seminar, Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, USA, August 2006 – August 2008. | Computational Mathematics Seminar webpage at <http://people.clemson.edu/~shuyu/seminar>
- 10 Co-chair (with Alfons Hoekstra, Valeria Krzhizhanovskaya, Juergen Geiser), *the 4th International Workshop on Simulation of Multiphysics Multiscale Systems*, within the International Conference on Computational Science, Beijing, China, May 27-30, 2007.
- 11 Chair (with Mary F. Wheeler and Ivan Yotov), the minisymposium of “Multiscale and physics-preserving algorithms for multiphase flow, transport, and reaction in porous media” in the SIAM Conference on Mathematical & Computational Issues in the Geosciences, Santa Fe, New Mexico, March 19-22, 2007.
- 12 Session chair, *the 3rd International Conference on Computing, Communication and Control Technologies (CCCT '05)*, Austin, Texas, July 24-27, 2005.
- 13 Organizer, the Weekly Graduate Student Seminar, the Center for Surface Modeling, the University of Texas at Austin, 2004-2005.

## PUBLICATIONS

### *Papers in Refereed Archival Journals*

- 1 J. Kou and S. Sun, “Convergence of discontinuous Galerkin methods for incompressible two-phase flow in heterogeneous media”, *SIAM Journal on Numerical Analysis*, in press, 2014.
- 2 J. Kou and S. Sun, “Upwind discontinuous Galerkin Methods with mass conservation of both phases for incompressible two-phase flow in porous media”, *Numerical Methods for Partial Differential Equations*, in press, 2014.
- 3 H. Dong, Z. Qiao, S. Sun, and T. Tang, “Adaptive moving grid methods for two-phase flow in porous media”, *Journal of Computational and Applied Mathematics*, accepted.
- 4 A. Salama, M. F. ElAmin, and S. Sun, “Three-dimensional, numerical investigation of flow and heat transfer in rectangular channels subject to partial blockage”, *Heat Transfer Engineering*, accepted.
- 5 M. F. ElAmin, S. Sun, et al, "A generalized power-law scaling law for a two-phase imbibition in a porous medium", *J. Petrol. Science and Engineering*, accepted.
- 6 J. Kou and S. Sun, “An adaptive finite element method for simulating surface tension with the gradient theory of fluid interfaces,” *Journal of Computational and Applied Mathematics*, 255: 593–604, 2014. | URL: <http://dx.doi.org/10.1016/j.cam.2013.06.017>
- 7 A. Salama, W. Li, and S. Sun, “Finite volume approximation of the three-dimensional flow equation in axisymmetric, heterogeneous porous media based on local analytical solution”, *J. Hydrology*, accepted.
- 8 J. Kou and S. Sun, “Analysis of a combined mixed finite element and discontinuous Galerkin method for incompressible two-phase flow in porous media,” *Mathematical Methods in the Applied Sciences*, in press, 2013. | URL: <http://dx.doi.org/10.1002/mma.2854>

- 9 A. Salama, S. Sun, and M. F. El-Amin, "An efficient IMPES-based, shifting matrix algorithm to simulate two-phase, immiscible flow in porous media with application to CO<sub>2</sub> sequestration in the subsurface", *SPE J.*, 163140-PA.
- 10 A. Salama, S. Sun, and M. F. El-Amin, "A multi-point flux approximation of the steady state heat conduction equation in anisotropic media", *ASME, J. Heat Transfer*, 135(4): 041302 (6 pages), 2013. | URL: <http://dx.doi.org/10.1115/1.4023228>
- 11 J. Cai and S. Sun, "Fractal analysis of fracture increasing spontaneous imbibition in porous media saturated with gas," *International Journal of Modern Physics C (Int. J. Mod. Phys. C)*, 24(8): 1350056 (13 pages), 2013. | URL: <http://dx.doi.org/10.1142/S0129183113500563>
- 12 M. F. El-Amin, A. Salama and S. Sun, "Numerical and dimensional investigation of two-phase countercurrent imbibition in porous media", *Journal of Computational and Applied Mathematics*, Volume 242, Pages 285–296, April 2013. | URL: <http://dx.doi.org/10.1016/j.cam.2012.09.035>
- 13 Y. Wang, S. Sun and B. Yu, "On full-tensor permeabilities of porous media from numerical solutions of the Navier-Stokes equation", *Advances in Mechanical Engineering*, Volume 2013, Article ID 137086, 11 pages, 2013. | URL: <http://dx.doi.org/10.1155/2013/137086>
- 14 A. Salama, I. A. Abbas, M. F. El-Amin, S. Sun, "Comparison study between the effects of different terms contributing to viscous dissipation in saturated porous media", *International Journal of Thermal Sciences*, 64: 195–203, February 2013. | URL: <http://dx.doi.org/10.1016/j.ijthermalsci.2012.08.021>
- 15 S. Sun, A. Firoozabadi, and J. Kou, "Numerical modeling of two-phase binary fluid mixing using mixed finite elements", *Computational Geosciences*, Volume 16, Issue 4, pp 1101-1124, September 2012. | URL: <http://dx.doi.org/10.1007/s10596-012-9306-2>
- 16 M. Ferdows, Md. S. Khan, Md. M. Alam, and S. Sun, "MHD mixed convective boundary layer flow of a nanofluid through a porous medium due to an exponentially stretching sheet," *Mathematical Problems in Engineering*, vol. 2012, Article ID 408528, 21 pages, 2012. | URL: <http://dx.doi.org/10.1155/2012/408528>
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- 20 P. Song and S. Sun, "Contaminant flow and transport simulation in cracked porous media using locally conservative schemes", *Advances in Applied Mathematics and Mechanics (AAMM)*, 4(4): 389-421, 2012. | URL: <http://www.global-sci.org/aamm/volumes/v4n4/index.html>
- 21 M. F. El-Amin, A. Salama and S. Sun, "Effects of gravity and inlet location on a two-phase countercurrent imbibition in porous media," Special issue on Advances in Computational Fluid Dynamics, *International Journal of Chemical Engineering*, Article ID 210128, 7 pages, 2012. | URL: <http://dx.doi.org/10.1155/2012/210128>
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- 23 K. Bao, A. Salama, and S. Sun, "Upscaling of permeability field of fractured rock system: numerical examples," *Journal of Applied Mathematics*, Volume 2012 (2012), Article ID 546203, 20 pages, 2012. | URL: <http://dx.doi.org/10.1155/2012/546203>
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- 25 M. Algharamti, I. Hoteit, and S. Sun, "Low-rank Kalman filtering for efficient state estimation of subsurface advective contaminant transport models", *Journal of Environmental Engineering*, 138(4), 446–457, 2012. | URL: [http://dx.doi.org/10.1061/\(ASCE\)EE.1943-7870.0000484](http://dx.doi.org/10.1061/(ASCE)EE.1943-7870.0000484)
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- 36 M. F. El-Amin and S. Sun, "Effects of gravity and inlet/outlet location on a two-phase co-current imbibition in porous media," *Journal of Applied Mathematics*, special issue on "Mathematical and Numerical Modeling of Flow and Transport", Volume 2011 (2011), Article ID 673523, 18 pages, 2011. | URL: <http://dx.doi.org/10.1155/2011/673523>
- 37 M. F. El-Amin, N. A. Ebrahim, A. Salama, and S. Sun, "Radiative mixed convection over an isothermal cone embedded in a porous medium with variable permeability," *Journal of Applied Mathematics*, special issue on "Mathematical and Numerical Modeling of Flow and Transport", Volume 2011 (2011), Article ID 124590, 10 pages, 2011. | URL: <http://dx.doi.org/10.1155/2011/124590>
- 38 X. Fan, S. Sun, W. Wei, and J. Kou, "Numerical simulation of pollutant transport in fractured vuggy porous Karstic aquifers," *Journal of Applied Mathematics*, special issue on "Mathematical and Numerical Modeling of Flow and Transport", Volume 2011 (2011), Article ID 498098, 41 pages, 2011. | URL: <http://dx.doi.org/10.1155/2011/498098>
- 39 M. F. El-Amin, S. Sun, M. A. El-Ameen, Y. A. Jaha and R. S. R. Gorla, "Non-Darcy free convection of power-law fluids over a two-dimensional body embedded in a porous medium", *Transport in Porous Media*, 86(3): 965-972, 2011. | URL: <http://dx.doi.org/10.1007/s11242-010-9667-8>
- 40 M. F. El-Amin, S. Sun and H. Kanayama, "Non-Boussinesq turbulent buoyant jet of a low-density gas leaks into high-density ambient," *Applied Mathematics and Computation*, 217: 3764–3778, 2010. | URL: <http://dx.doi.org/10.1016/j.amc.2010.09.035>
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- 45 J. Kou, X. Wang, and S. Sun, “Some new root-finding methods with eighth-order convergence”, *Bull. Math. Soc. Sci. Math. Roumanie*, 53(101), No. 2, 133–143, 2010. | URL: [www.rms.unibuc.ro/bulletin/pdf/53-2/Kou.pdf](http://www.rms.unibuc.ro/bulletin/pdf/53-2/Kou.pdf)
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#### Refereed Proceedings Publications

- 1 M. F. El-Amin, S. Sun, A. Salama, “Enhanced oil recovery by nanoparticles injection: modeling and simulation,” SPE Middle East Oil and Gas Show and Exhibition, to be held in Manama, Bahrain, 10–13 March 2013.
- 2 R. Ellen et al, SPE Reservoir Simulation Symposium, Texas, USA, Feb 2013.

- 3 K. Bao et al, SPE Reservoir Simulation Symposium, Texas, USA, Feb 2013.
- 4 M.F. El-Amin, S. Sun, and A. Salama, "Modeling and simulation of nanoparticle transport in multiphase flows in porous media: CO<sub>2</sub> sequestration," In: *Mathematical Methods in Fluid Dynamics and Simulation of Giant Oil and Gas Reservoirs*, Istanbul, Turkey, 3-5 September 2012. [Paper: SPE-163089-MS] | URL: <http://dx.doi.org/10.2118/163089-MS>
- 5 A. Salama, S. Sun, and M. F. ElAmin, "A novel numerical approach for the solution of the problem of two-phase, immiscible flow in porous media: Application to LNAPL and DNAPL", AIP Conf. Proc. 1453, pp. 135-140 (6 pages), 4th International Conference on Porous Media and its Applications in Science, Engineering and Industry, June 17-22, 2012, Potsdam, Germany. | URL: <http://dx.doi.org/10.1063/1.4711165>
- 6 H. Osman, A. Salama, S. Sun, and K. Bao, "A finite difference, multipoint flux numerical approach to flow in porous media: Numerical examples", AIP Conf. Proc. 1453, pp. 217-222 (6 pages), 4th International Conference on Porous Media and its Applications in Science, Engineering and Industry, June 17-22, 2012, Potsdam, Germany. | URL: <http://dx.doi.org/10.1063/1.4711178>
- 7 A. Salama, A. Azamatov, M.F. El-Amin, S. Sun, and H. Huang, "CFD investigation of flow and heat transfer of nanofluids in isoflux spirally fluted tubes," SPE International Oilfield Nanotechnology Conference and Exhibition, 12–14 June 2012, Noordwijk, The Netherlands. [Paper: SPE-154466-MS-P] | URL: <http://dx.doi.org/10.2118/154466-MS>
- 8 M.F. ElAmin, A. Salama, and S. Sun, "Modeling and simulation of nanoparticle transport in a two phase flow in porousmedia," SPE International Oilfield Nanotechnology Conference and Exhibition, 12–14 June 2012, Noordwijk, The Netherlands. [Paper: SPE-154972-MS-P] | URL: <http://dx.doi.org/10.2118/154972-MS>
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- 11 M. Lieb, T. Neckela, H.-J. Bungartz, and S. Sun, "Towards a Navier Stokes - Darcy upscaling based on permeability tensor computation," In: *Procedia Computer Science*, Volume 9, 2012, Pages 717–726, Proceedings of ICCS 2012 (International Conference on Computational Science), June 4 -6, 2012, Omaha, Nebraska, USA. | URL: <http://dx.doi.org/10.1016/j.procs.2012.04.077>
- 12 R. Allen and S. Sun, "Carbon dioxide sequestration: modeling the diffusive and convective transport under a CO<sub>2</sub> cap," In: *2012 SPE Saudi Arabia Section Technical Symposium and Exhibition*, Al-Khobar, Saudi Arabia, 8–11 April 2012. [Paper: SPE-160881-MS-P] | URL: <http://dx.doi.org/10.2118/160881-MS>
- 13 A. Salama, S. Sun, and M.F. El-Amin, "An efficient IMPES-based, shifting matrix algorithm to simulate two-phase, immiscible flow in porous media with application to CO<sub>2</sub> sequestration in the subsurface," In: *Proceedings of Carbon Management Technology Conference*, Feb 7-9, 2012, Orlando, Florida, USA. [Paper: SPE 150291-MS] | URL: <http://dx.doi.org/10.7122/150291-MS>
- 14 M F El-Amin, A Negara, A Salama, S Sun, "Simulation of coupled flow and mechanical deformation using implicit pressure-displacement explicit saturation (IMPDES) scheme", In: *2012 SPE Middle East Unconventional Gas Conference and Exhibition*, Abu Dhabi, UAE, 23–25 January 2012. [Paper: SPE 150855-PP] | URL: <http://dx.doi.org/10.2118/150855-MS> []
- 15 M.F. El-Amin, A. Negara, A. Salama, K. Bao, and S. Sun, "CO<sub>2</sub> injection into oil reservoir associated with structural deformation," SPE Saudi Arabia Section Technical Symposium and Exhibition, Al-Khobar, Saudi Arabia, 8-11 April 2012. [Paper: SPE-160830-MS] | URL: <http://dx.doi.org/10.2118/160830-MS>
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- 21 C. Dong and S. Sun, "Simulation of contaminant transport in fractured porous media on triangular meshes", in: *Proceedings of ICCIS2010*, Pages 136-139, the 2010 International Conference on Computational and Information Sciences, Chengdu, Sichuan, China, December 17 - 19, 2010. | URL: <http://dx.doi.org/10.1109/ICCIS.2010.39>
- 22 S. Sun and A. Firoozabadi, "Compositional modeling in three-phase flow for CO<sub>2</sub> and other fluid injections using higher-order finite element methods", In: *Proceedings of the SPE Annual Technical Conference and Exhibition*, New Orleans, Louisiana, October 4-7, 2009. [Paper: SPE-124907] | URL: <http://dx.doi.org/10.2118/124907-MS>
- 23 S. Sun and J. Geiser, "Multiscale discontinuous Galerkin methods for modeling flow and transport in porous media", *Lecture Notes in Computer Science (LNCS) 4487*, Proceedings of ICCS 2007, Part I, Y. Shi et al. (Eds.), pp. 890-897, Beijing, China, May 27-30, 2007. | URL: [http://dx.doi.org/10.1007/978-3-540-72584-8\\_117](http://dx.doi.org/10.1007/978-3-540-72584-8_117)
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- 25 A. A. Rodriguez, H. Klie, S. Sun, X. Gai, M.F. Wheeler, H. Florez, and U. Simon Bolivar, "Porous media upscaling of hydraulic properties: full permeability tensor and continuum scale simulations", In: *Proceedings of the 2006 SPE Symposium on Improved Oil Recovery*, Tulsa, Oklahoma, USA, April 22-26, 2006. [Paper: SPE100057] | URL: <http://dx.doi.org/10.2118/100057-MS>
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- 29 S. Sun, M. F. Wheeler, M. Obeyesekere and C. W. Patrick Jr., "Multiscale angiogenesis modeling", In: *Proceedings of the 2<sup>nd</sup> International Workshop on Simulation of Multiphysics Multiscale Systems (in conjunction with the ICCS'2005 conference)*, Part III, pp 96-103, Atlanta, Georgia, May 22-25, 2005. | URL: [http://dx.doi.org/10.1007/11428862\\_13](http://dx.doi.org/10.1007/11428862_13)
- 30 S. Sun and M. F. Wheeler, "A dynamic, adaptive, locally conservative and nonconforming solution strategy for transport phenomena in chemical engineering", In: *Proceedings of the American Institute of Chemical Engineers (AIChE) 2004 Annual Meeting*, Austin, Texas, November 7-12, 2004.
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- 33 S. Sun, M. F. Wheeler, M. Obeyesekere and C. W. Patrick Jr., "Nonlinear behavior of capillary formation in a deterministic angiogenesis model", In: *Proceedings of the 4th World Congress of Nonlinear Analysts*, Orlando, Florida, June 30 - July 7, 2004.
- 34 S. Sun, B. Riviere and M. F. Wheeler, "A combined mixed finite element and discontinuous Galerkin method for miscible displacement problems in porous media", In: *Proceedings of International Symposium on Computational and Applied PDEs held at Zhangjiajie National Park of China*, pp. 321-348, 2002.
- 35 S. Sun, S. Wang and K. T. Yu, "The liquid mixing behavior in a column containing corrugated structured packing", In: *Proceeding of the 2<sup>nd</sup> China-US Conference in Chemical Engineering*, pp. 443-446, CIESC and AIChE, Beijing, China, 1997.

#### *Non-Refereed Publication in Proceedings and Special Issues*

- 1 S. Sun, M. F. El-Amin, Z. Chen, and H. Kanayama, "Mathematical and Numerical Modeling of Flow and Transport 2012," *Journal of Applied Mathematics*, vol. 2012, Article ID 318496, 4 pages, 2012. | URL: <http://dx.doi.org/10.1155/2012/318496>
- 2 S. Sun, E. W. Jenkins, Z. Chen, and J. Geiser, "Mathematical and Numerical Modeling of Flow and Transport," *Journal of Applied Mathematics*, vol. 2011, Article ID 901380, 4 pages, 2011. | URL: <http://dx.doi.org/10.1155/2011/901380>
- 3 S. Sun and M. F. Wheeler, "Dynamically adaptive discontinuous Galerkin methods for contaminant transport in porous media", In: *Proceedings of the M&C-2005 International Topical Meeting on Mathematics and Computation, Supercomputing, Reactor Physics and Nuclear and Biological Applications*, Palais des Papes, Avignon, France, September 12-15, 2005, on CD-ROM, American Nuclear Society, LaGrange Park, IL, 2005.
- 4 M. F. Wheeler, O. Eslinger, S. Sun and B. Riviere, "Discontinuous Galerkin method for modeling flow and reactive transport in porous media", In: *Proceedings of the 2002 CANUM conference*, series ESAIM, 2002.
- 5 M. Peszynska and S. Sun, "Reactive transport model coupled to multiphase flow models", In: *Proceedings of XIV International Conference on Computational Methods in Water Resources*, In: *Computational Method in Water Resources*, S. M. Hassanizadeh, R. J. Schotting, W. G. Gray, and G. F. Pinder, Eds., Elsevier, pp. 923-930, Delft, The Netherlands, June, 2002.
- 6 S. Sun, S. Wang and K. T. Yu, "Liquid distribution in a large scale column containing corrugated plate packing", In: *Proceedings of the 8<sup>th</sup> National Conference of Chemical Engineering*, pp. 482-485, Tianjin, China, October 1996.
- 7 K. T. Yu and S. Sun, "The distillation simulation in a large scale column containing structured packing with three dimensional non-equilibrium mixing-pool model", In: *Proceedings of the 8<sup>th</sup> National Conference of Chemical Engineering*, pp. 476-481, Tianjin, China, October 1996.
- 8 S. Sun and Z. Jiang, "Simulation of multistage fluidized bed adsorption process by Monte Carlo method", In: *Proceedings of the International Conference of Reactive Polymers*, pp. 143-145, Xi'an, China, 1994.

#### *Technical Reports*

(Note: full documents for ICES reports are available online at <http://www.ices.utexas.edu/research/reports/>)

- 1 A. Salama, S. Sun, and M.F. El-Amin, "CO<sub>2</sub> plume migration into the subsurface: numerical investigation using shifting matrix technique," CSIM Midyear Report, 2011.
- 2 M. F. El-Amin, A. Negara, A. Salama, and S. Sun, "Simulation of CO<sub>2</sub> Injection in layered porous media with structural deformation effect," CSIM Midyear Report, 2011.
- 3 J. Li, H. Huang, M F ElAmin, and S. Sun, "Monte Carlo molecular simulation of phase equilibrium properties of reservoir fluids with emphasis to sulfur solubility in sour gas", Report No. 1 to Saudi Aramco (CRPO #: 6510454094) for Q1-2 (1-6 month) Duration of Year 1, Computational Transport

- Phenomena Laboratory (CTPL), King Abdullah University of Science and Technology (KAUST), July 15, 2011.
- 4 H. Huang, A Salama, M F ElAmin, and S. Sun, "Computing phase equilibrium of two-component reservoir fluids using Monte Carlo molecular simulation", Report No. 2 to Saudi Aramco (CRPO #: 6510435957) for Q2-4 (4-12 month) Duration of Year 1, Computational Transport Phenomena Laboratory (CTPL), King Abdullah University of Science and Technology (KAUST), July 5, 2011.
  - 5 C. Xu, M F ElAmin, and S. Sun, "Gibbs ensemble Monte Carlo simulation of thermodynamic properties of reservoir fluids – literature review", Report No. 1 to Saudi Aramco (CRPO #: 6510435957) for Q1 (1-3 month) Duration of Year 1, Computational Transport Phenomena Laboratory (CTPL), King Abdullah University of Science and Technology (KAUST), Nov 12, 2010.
  - 6 M. F. El-Amin and S. Sun, "A new scaling-law of a two-phase flow in porous media in terms of characteristic velocity", In: *The CSIM book of 2010 (an annual report of the Center for Subsurface Imaging and Fluid Modeling consortium at KASUT)*, September 2010.
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  - 8 J. Kou and S. Sun, "A new treatment of capillarity to improve the stability of IMPES two-phase flow formulation", In: *The CSIM book of 2010 (an annual report of the Center for Subsurface Imaging and Fluid Modeling consortium at KASUT)*, September 2010.
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  - 10 S. Sun and M. F. Wheeler, "Anisotropic and dynamic mesh adaptation for discontinuous Galerkin methods applied to reactive transport", *ICES Report 05-15*, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, Texas, March 2005.
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  - 12 S. Sun and M. F. Wheeler, "Projection methods for constructing a velocity field compatible with transport", *ICES Report 04-16*, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, Texas, March 2004.
  - 13 S. Sun, "Discontinuous Galerkin methods for reactive transport in porous media", *ICES Report 04-1*, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, Texas, January 2004.
  - 14 S. Sun and M. F. Wheeler, "Discontinuous Galerkin methods for coupled flow and reactive transport problems", *TICAM Report 03-49*, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, Texas, December 2003.
  - 15 S. Sun and M. F. Wheeler, "Energy norm *a posteriori* error estimation for discontinuous Galerkin approximations of reactive transport problems", *TICAM Report 03-39*, Institute for Computational Engineering and Sciences, The University of Texas at Austin, Austin, Texas, August 2003.
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  - 18 M. Peszynska and S. Sun, "Reactive transport model coupled to multiphase flow models", *TICAM Report 02-04*, Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin, Austin, Texas, January 2002.
  - 19 M. Peszynska and S. Sun, "Multiphase reactive transport module TRCHEM in IPARS", *TICAM Report 01-32*, Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin, Austin, Texas, October 2001.
  - 20 M. Peszynska, S. Bryant, S. Sun, T. LaForce and S. Snider, "Modeling of Couplex1 case with IPARS TRCHEM module", *TICAM Report 01-31*, Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin, Austin, Texas, October 2001.

*Theses*

- 1 S. Sun, *Discontinuous Galerkin methods for reactive transport in porous media*, Ph.D. dissertation, The University of Texas at Austin, 2003.
- 2 S. Sun, *Fluid mechanics behavior of liquid phase and its effects on distillation in a column containing structured packing*, Doctor of Engineering dissertation, Tianjin University, 1997.
- 3 S. Sun, *Simulation of multistage fluidized bed adsorption processes by Monte Carlo Methods*, Master's thesis, Tianjin University, 1994.
- 4 S. Sun, *Removal of oil from wastewater by coalescence technology*, Bachelor's thesis, Tianjin University, 1991.

*Books / Book Chapters*

- 1 M. F. Wheeler, S. Sun and S. G. Thomas, "Modeling of Flow and Reactive Transport in IPARS", In: *Mathematical Modeling of Reactive Transport in Groundwater*, Pages 42-73, Edited by F. Zhang, G.-T. Yeh and J. C. Parker, eISBN: 978-1-60805-306-3, ISBN: 978-1-60805-525-8, Bentham Science Publishers, 2012. | Book URL: <http://dx.doi.org/10.2174/97816080530631120101>; Chapter URL: <http://dx.doi.org/10.2174/978160805306311201010042>
- 2 M. F. El-Amin, Salama and S. Sun, "Solute transport with chemical reaction in single- and multi-phase porous media," In: M El-Amin (Ed) *Mass Transfer in Multiphase Systems and its Applications*, ISBN 978-953-307-215-9, pp 27-48, Published by INTECH, Rijeka, Croatia, February 2011.
- 3 S. Sun, M. F. Wheeler, M. Obeyesekere and C. Patrick, "Multiscale Angiogenesis Modeling", In: *Lecture Notes in Computer Science*, ISSN 0302-9743, Volume 3516, Pages 96–103, Apr 2005.
- 4 M. F. Wheeler, S. Sun, O. Eslinger and B. Riviere, "Discontinuous Galerkin method for modeling flow and reactive transport in porous media", In: *Analysis and Simulation of Multifield Problem*, Edited by W. Wendland, ISBN 3540006966, Springer Verlag Publishers, pp. 37–58, August 2003.
- 5 S. Sun, B. Riviere and M. F. Wheeler, "A combined mixed finite element and discontinuous Galerkin method for miscible displacement problems in porous media", In: *Recent Progress in Computational and Applied PDEs*, Edited by T. F. Chan, Y. Huang, T. Tang, J. Xu and L.-A. Ying, ISBN 0306474204, Kluwer Academic/Plenum Publishers, pp. 321–348, February 2003.

*Book Chapters Accepted or in Progress*

- 6 G. Han, S. Sun and M. Dong, "Capacity collaboration under the risk of production disruptions in semiconductor supply chains," In: *Supply Chain Coordination and Management*, ISBN: 978-953-7619-X-X, InTech Publisher (in press).
- 7 M. F. El-Amin and S. Sun, "On the Two-Phase Flow in Porous Media: Scaling using Velocity; Open-Boundary and Gravity Effects; Non-Dimensional Analysis; Similarity Solutions; Compositional Modeling (CO<sub>2</sub> Injection); Negative Capillary Pressure Challenge; and Structural Deformation Effect", In: *Advances in Multiphase Flow and Heat*, Vol. 5, 2011, Edited by L. Cheng and D. Mewes, Bentham Science Publishers Ltd (in press).
- 8 M. F. El-Amin, Y. A. Jaha, M. A. El-Ameen and S. Sun, "Turbulent buoyant jet of a low-density gas leaks into high-density ambient: Hydrogen leakage in air", In: *Mass Transfer*, ISBN: 978-953-7619-X-X, InTech Publisher (in press).

**ORAL PRESENTATIONS / INVITED TALKS**

- 1 (Invited) "High-performance modeling of CO<sub>2</sub> sequestration by coupling reservoir simulation and molecular dynamics," the 2012 Annual CSIM Workshop, Omni Hotel in Houston, Texas, USA, February 1, 2013 (January 30 – February 1, 2012 for the entire workshop).
- 2 (Invited) "Compatible algorithms for coupling multiphysics in subsurface flow and transport", presented in the Workshop on Numerical Analysis and Computational Mathematics, Fourth Floor Auditorium, Building 15, Department of Mathematics and Statistics, King Fahd University of Petroleum and Minerals (KFUPM), 1:45-2:30pm, Tuesday December 4, 2012.

- 3 (Invited) “Multiscale modeling of thermodynamics and compositional flow in porous media”, presented in NumPor Kick-off meeting, Conference Room 5220, Building 3, KAUST, 2:45pm, October 6, 2012.
- 4 (Invited) “A gentle introduction to fluid flow and its interaction with geomechanics and seismology, with application to carbon sequestration”, the KAUST ErSE (Earth Science and Engineering) Seminar, Lecture Hall 1, Building 9, KAUST, Thuwal, Saudi Arabia, 4:15 – 5:15 pm, Sept 25, 2012.
- 5 (Invited) “Modeling of subsurface flow and transport using conservative finite elements”, presented in Symposium on Geophysical Flows, Nanyang Hotel, Xi’an Jiaotong University, Xi’an, China, 3:35 – 4:15 pm, July 22, 2012 (July 22-24, 2012 for the entire symposium).
- 6 (Invited) A series of lectures (teaching together with Zhangxing Chen and Dabao Liu), the Workshop on Modeling and Simulation of Multiphase Flow and Applications to Energy Recovery (多相流数值模拟及其在能源上的应用), Beijing International Center for Computational Physics (BICCP), Beijing, China, Monday, July 9, 2012 – Saturday, July 14, 2012.
- 7 (Invited) “Compatibility of algorithms for flow and transport”, presented in as a special seminar talk in the College of Science, Guizhou University, Guiyang, China, June 27, 2012.
- 8 (Invited) “Compatible finite element simulation of subsurface flow and transport with application to carbon sequestration”, presented in 2012 Foundation CMG Annual Chair meeting, Calgary, Canada, June 18, 2012.
- 9 (Invited) “Compatible algorithms for flow and transport with application to carbon sequestration”, presented in CSE (Computational Science and Engineering) special seminar, Yonsei University, Seoul, Korea, 5:00 pm, June 15, 2012.
- 10 (Invited) “Simulation of flow and transport in subsurface carbon sequestration using conservative finite element methods”, presented in the 2012 International Conference on Applied Mathematics: Modeling, Analysis & Computation, City University of Hong Kong, Hong Kong, May 29, 2012. (May 28 – June 1, 2012 for the entire conference).
- 11 (Invited) “Finite Element Modeling of Hydrology: Coupling of Conservative Methods”, presented in the 4th Annual IAMCS (Institute for Applied Mathematics and Computational Science, Texas A&M University) Spring Symposium, KAUST, Thuwal, Saudi Arabia, 11:25am, May 7, 2012 (May 6 - 7, 2012 for the entire symposium).
- 12 (Invited) “Modeling and simulation of subsurface flow and transport”, presented in 2nd KICP (KAUST Industry Collaboration Program) Annual Research Symposium, KAUST Campus, Bldg 19, Conference Hall 1 & 2, 2:30pm, Thuwal, Saudi Arabia, Apr 23, 2012.
- 13 (Invited) “Simulation of multiphase flow in porous media using locally conservative finite element methods”, presented in The Eighth International Conference on Scientific Computing and Applications, University of Nevada, Las Vegas, USA, 3:00 - 3:30 pm, April 2, 2012 (April 1 - 4, 2012 for the entire conference).
- 14 (Invited) “Towards better understanding of subsurface flow: from the molecular scale to the REV scale,” Presented in the KAUST-ARAMCO-SDCRC Collaboration Meeting on Next Generation Upstream Oil and Gas Technologies, Conference Room 5209, Level 5, Building 4, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, 11:30-11:50am, March 1, 2012 (February 29 – March 1, 2012 for the entire meeting).
- 15 (Invited) “Overview of molecular simulation & other research in the Computational Transport Phenomena Lab (CTPL) at KAUST”, presented in the R and D Center, Saudi Aramco Oil Company, Dhahran, Saudi Arabia, February 22, 2012.
- 16 (Invited) “Overview of reservoir simulation research at KAUST,” the 2011 Annual CSIM Workshop, Omni Hotel in Houston, Texas, USA, 11:30-11:50am, February 10, 2012 (February 8-10, 2012 for the entire meeting).
- 17 (Contributed, with M. F. El-Amin et al) “Simulation of coupled flow and mechanical deformation using implicit pressure-displacement explicit saturation (IMPDES) scheme”, presented in: 2012 SPE Middle East Unconventional Gas Conference and Exhibition, Abu Dhabi, UAE, January 23–25, 2012.
- 18 (Invited) “Overview of research in the Computational Transport Phenomena Lab (CTPL) at KAUST”, presented in EXPEC Advanced Research Center, Bldg 137, Saudi Aramco Oil Company, Dhahran, Saudi Arabia, December 13, 2011.
- 19 (Invited) “Finite Difference Methods (FDM) derived from Mixed Finite Element Methods (FEM) for subsurface flow”, School of Mathematical Sciences, South China Normal University, Guangzhou, China, 4:30-5:30pm, November 5, 2011.

- 20 (Contributed, with J. Li et al), "Monte Carlo molecular simulation of phase-coexistence for oil production and processing," presented in: 2011 SPE Reservoir Characterization and Simulation Conference and Exhibition (RCSC), Abu Dhabi, UAE, October 9-11, 2011.
- 21 (Invited) "Evaluation of sulfur solubility in natural gas with molecular simulation," Saudi Aramco-KAUST 2<sup>nd</sup> Research Oversight Committee Meeting, Bld 16, L3, Rm 3103, KAUST, Thuwal, Saudi Arabia, September 12, 2011.
- 22 (Invited) "Modeling multi-component phase equilibrium of reservoir fluids with molecular simulation," Saudi Aramco-KAUST 2<sup>nd</sup> Research Oversight Committee Meeting, Bld 16, L3, Rm 3103, KAUST, Thuwal, Saudi Arabia, September 12, 2011.
- 23 (Invited) "Fluid dynamics and thermodynamics of petroleum reservoirs: an introduction to their modeling and simulation (Part II)", presented in Conf Room 404, Science Building, Xi'an Jiaotong University, Xi'an, China, 9:00-10:00am, Thursday July 28, 2011.
- 24 (Invited) "Fluid dynamics and thermodynamics of petroleum reservoirs: an introduction to their modeling and simulation (Part I)", presented in Conf Room 404, Science Building, Xi'an Jiaotong University, Xi'an, China, 9:00-10:00am, Tuesday July 26, 2011.
- 25 (Invited) "Reservoir Simulation: an Introduction to Subsurface Multiphase Flow", presented in Building Stauffer III, Department of Chemical Engineering, Stanford University, Palo Alto, California, 3:00-4:30pm, July 11, 2011.
- 26 (Invited) "Multi-purpose simulation for subsurface flow and transport", presented in the 2011 Foundation CMG Annual Research Chairs Meeting, University of Calgary, Calgary, Canada, July 5, 2011.
- 27 (Invited) "Simulations of porous media flow and transport by discontinuous Galerkin and enriched Galerkin finite elements", presented in the 2011 International Conference on Applied and Computational Mathematics and Interdisciplinary Research (ICAMIR), Chern Institute of Mathematics, Nankai University, Tianjin, China. June 13-15, 2011 (my talk: 4:10-4:45pm, June 13, 2011).
- 28 (Invited) "Understanding Finite Difference Methods (FDM) from the point of view of Finite Element Methods (FEM)", School of Mathematics and Computer Science, Guizhou Normal University, Guiyang, China, 3:00pm, June 10, 2011.
- 29 (Invited, with M. El-Amin), "A finite difference scheme for double-diffusive unsteady free convection from a curved surface to a saturated porous medium with a non-Newtonian fluid," presented in *International Workshop on Flow and Transport: Computational Challenges*, within the International Conference on Computational Science (ICCS 2011), Nanyang Technological University, Singapore, June 1-3, 2011.
- 30 (Contributed, with A. Negara et al), "Modeling and simulation of structural deformation of isothermal subsurface flow and carbon dioxide injection," presented in: 2011 SPE Saudi Arabia Section Technical Symposium and Exhibition, held in AlKhobar, Saudi Arabia, 15-18 May 2011.
- 31 (Invited) "Reservoir simulation: overview of research on the modeling and computation of subsurface flow and transport", presented in the first Annual KICP (KAUST Industry Collaboration Program) Research Symposium, KAUST, Thuwal, Saudi Arabia, 5:30pm, May 2, 2011.
- 32 (Invited, with Jerry Schuster), "Overview of the research at the Center for Subsurface Imaging and Fluid Flow Modeling, Part II: Reservoir Simulation", presented in the Coding Days Workshop, a meeting between KAUST and Partners from The Technical University of Munich (TUM), Building 1, KAUST, Thuwal, Saudi Arabia, 11:00am, April 20, 2011 (Part I was presented by Prof. Jerry Schuster).
- 33 (Invited) "Reservoir Simulation Research at KAUST", presented in the Inaugural Dinner of the SPE Student Chapter at KAUST, Fellowship Hall, Student Center, KAUST, Thuwal, Saudi Arabia, 7:15pm, April 18, 2011.
- 34 (Invited) "Mathematics of petroleum reservoir simulation", School of Mathematics and Computer Science, Guizhou Normal University, Guiyang, China, 10:00-10:00am, April 6, 2011.
- 35 (Contributed, with E. Jenkins and V. Ervin) "Coupled generalized non-linear Stokes flow with flow through porous media", in Session 18, 3:45-4:15pm, April 5, 2011, in the Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia, USA, April 4-7, 2011.
- 36 (Invited) "An implicit approach to treat capillarity of IMPES two-phase flow formulation", presented in the session of "Advanced numerical modeling", 3:40-4:00pm, March 31, 2011, in the 3rd International Conference on Porous Media and Annual meeting of the International Society for Porous Media, Bordeaux Campus, France, March 29-31, 2011.

- 37 (Invited) "Incorporation of diffusion into compositional multiphase flow simulation", presented in the minisymposium of "Large Scale Simulations and Porous Media Applications" in the SIAM Conference on Mathematical & Computational Issues in the Geosciences, Long Beach, California, USA, March 21-24, 2011.
- 38 (Invited) "Enhanced successive substitution algorithm for multiphase flash calculations", presented in the minisymposium of "Simulation, Optimization and Assimilation of Subsurface Reservoirs" in the SIAM Conference on Mathematical & Computational Issues in the Geosciences, Long Beach, California, USA, March 21-24, 2011.
- 39 (Invited) "Conservative finite element methods for subsurface oil reservoir simulation", School of Mathematical Sciences, South China Normal University, Guangzhou, China, 10:30-11:30am, March 9, 2011.
- 40 (Invited) "Discontinuous Galerkin and enriched Galerkin finite element simulations of subsurface flow and transport", Department of Mathematics, Shanghai University, Shanghai, China, 10:00-11:00am, March 7, 2011.
- 41 (Invited) "Two-phase co-current and counter-current imbibition in porous media", the 2010 Annual CSIM Meeting, Omni Hotel in Houston, Texas, USA, 2:15-2:35pm, January 13, 2011 (January 13-14, 2011 for the entire meeting).
- 42 (Invited Keynote Talk) "Tutorial on basic and advanced fluid flow modeling", the 2010 Annual CSIM Meeting, Omni Hotel in Houston, Texas, USA, 1:15-1:45pm, January 13, 2011 (January 13-14, 2011 for the entire meeting).
- 43 (Invited) "Finite element simulation of multi-phase flow and transport in heterogeneous porous media," Department of Mathematics, North Carolina State University, Raleigh, North Carolina, USA, 3:00-4:00pm, January 4, 2011.
- 44 (Invited) "Mathematical issues in multi-component multi-phase flow and transport in heterogeneous porous media," Institute for Computational and Applied Mathematics, 10:00-11:00am, Xiangtan University, Hunan, China, December 22, 2010.
- 45 (Invited) "Computational issues in three-phase compositional flow in heterogeneous porous media," Shenzhen Institute of Advanced Technology (SIAT), Chinese Academy of Sciences (CAS), Shenzhen, Guangdong, China, 2:00-3:00pm, December 20, 2010.
- 46 (Contributed, with C. Dong) "Simulation of contaminant transport in fractured porous media on triangular meshes", The 2010 International Conference on Computational and Information Sciences (ICCIS2010), Chengdu, Sichuan, China, December 17 - 19, 2010.
- 47 (Invited) "Compositional modeling of multiphase flow in heterogeneous porous media with applications to enhanced oil recovery," College of Chemical Engineering, Beijing University of Chemical Technology (BUCT), 15 Beisanhuandong Rd, Beijing, China, 2:00pm, November 17, 2010.
- 48 (Invited) "Iterative IMPEC and conservative finite element methods for compositional multiphase flow in porous media," in Conference Room 337, Level 3, Building 5, The Institute of Software, Chinese Academy of Sciences (ISCAS), 4# South Fourth Street, Zhongguan Cun, Beijing, China, 10:00am November 16, 2010.
- 49 (Invited) "Do finite element methods tell us anything about finite difference methods?" AMCS (Applied Mathematics and Computational Science) Chalk Talk, Room 4102, Level 4, KAUST Bldg. 1, Thuwal, Saudi Arabia, 4:00-5:30pm, November 1, 2010.
- 50 (Invited) "Simulation of multiphase flow in heterogeneous porous media with capillarity", the Annual CSM Industrial Affiliates Meeting, the University of Texas at Austin, Austin, Texas, USA, October 26-27, 2010.
- 51 (Invited) "Towards accurate and efficient computational modeling of compositional multiphase flow", presented in the minisymposium of "Advances in Computational Modeling in the Geosciences" in the 2010 SIAM Annual Meeting (AN10), Pittsburgh, Pennsylvania, USA, July 12-16, 2010.
- 52 (Invited) "Adaptive discontinuous Galerkin method for contaminant transport in fractured porous media", presented in the minisymposium of "Advances in Nonconforming Finite Element Methods" in the 2010 SIAM Annual Meeting (AN10), Pittsburgh, Pennsylvania, USA, July 12-16, 2010.
- 53 (Invited) "Frontiers and future of multiphase fluid flow modeling in oil reservoirs", presented at the 2010 inaugural CSIM meeting, Room 5220, Level 5, KAUST Bldg. 2 (West), Thuwal, Saudi Arabia, 11:10-11:35am, May 1, 2010.
- 54 (Invited) "Finite element simulation of multiphase flow in heterogeneous porous media", presented at Xi'an Jiao Tong University, Xi'an, China, 4:10-5:00pm, April 2, 2010.

- 55 (Invited) “Finite element simulation of multiphase flow in heterogeneous porous media”, presented at the Department of Mathematics, Room 3416, Hong Kong University of Science and Technology, Hong Kong, 4:30-5:30pm, March 30, 2010.
- 56 (Invited) “Numerical simulation of subsurface multiphase flow using locally conservative finite element methods”, presented at the Department of Mathematics, Hong Kong Baptist University, Hong Kong, 2:30 – 3:30pm, March 29, 2010.
- 57 (Invited) “Compositional multiphase flow in heterogeneous porous media”, IAMCS Workshops on Computational and Mathematical Challenges in Material Science and Engineering: Complex Fluid Dynamics, KAUST, Thuwal, Saudi Arabia, March 22 - March 25, 2010.
- 58 (Invited) “Numerical simulation of two-phase flow in heterogeneous porous media”, the 2010 InterPore Conference and Annual Meeting, Texas A&M University, College Station, Texas, USA, March 14-17, 2010.
- 59 (Invited Plenary Talk) “Latest developments and future challenges in subsurface fluid flow modeling”, the 2009 Annual UTAM Meeting, Sutton Building, University of Utah, Salt Lake City, Utah, USA, 2:05-2:40pm, January 7, 2010.
- 60 (Invited) “Computational modeling of fluid flow through porous media and applications to oil reservoirs”, the KAUST Computational Geoscience Seminar, Building 1, Room 3119, KAUST, Thuwal, Saudi Arabia, 4:00pm, November 17, 2009.
- 61 (Invited) “Compositional modeling of multiphase flow in heterogeneous porous media using higher order finite element methods”, presented in School of Petroleum Engineering, China University of Petroleum-Beijing (CUPB), Beijing, China, 10:00am, November 6, 2009.
- 62 (Invited) “Higher order finite element methods for multiphase flow in porous media”, presented in Department of Mathematical Sciences, Tsinghua University, Beijing, China, 3:00pm, November 5, 2009.
- 63 (Invited) “Mathematics in energy and environment: simulation of multiphase flow and transport”, presented in the College of Science at Guizhou University, Guiyang, China, 3:00pm, November 2, 2009.
- 64 (Invited, with Abbas Firoozabadi) “Compositional modeling in three-phase flow for CO<sub>2</sub> and other fluid injections using higher-order finite element methods”, presented in the SPE Annual Technical Conference and Exhibition, New Orleans, Louisiana, October 6, 2009.
- 65 (Invited) “Discontinuous Galerkin and mixed finite element methods for multiphase flow modeling”, presented in the KAUST – Saudi Aramco ECC and IT Exploratory Collaboration Workshop, KAUST, Thuwal, Saudi Arabia, 11:10am, September 14, 2009.
- 66 (Invited) “Compositional three-phase flow: numerical modeling using combined discontinuous Galerkin and mixed finite element methods”, presented at Reservoir Engineering Research Institute (RERI), Palo Alto, California, 4:00-5:30pm, May 29, 2009.
- 67 (Invited) “Higher-order discontinuous Galerkin and mixed finite element methods with nonconforming meshes for two-phase flow modeling”, presented in the 20th RERI (Reservoir Engineering Research Institute) Anniversary Workshop, Palo Alto, California, May 11-12, 2009.
- 68 (Invited) “Adaptive discontinuous Galerkin methods for single- and two-phase flow and reactive transport in porous media”, ICES seminar, ACE 2.402, Institute for Computational Engineering and Sciences, The University of Texas at Austin, 10:00-11:00am, May 8, 2009.
- 69 (Invited) “Mixed finite element and discontinuous Galerkin methods for two-phase flow in porous media”, presented in the minisymposium of “Computational issues in porous media flows”, the 33rd SIAM Southeastern-Atlantic Section Annual Meeting, University of South Carolina, Columbia, South Carolina, 10:30am - 10:55am, April 4, 2009.
- 70 (Invited) “Numerical methods for flow and transport in porous media”, the Research Introductory Seminar to First-Year Graduate Students in the Department of Mathematical Sciences, Clemson University, South Carolina, 4:30pm, March 24, 2009.
- 71 (Invited) “Adaptive and locally conservative numerical methods for flow and transport in porous media”, presented in the minisymposium of “Numerical Simulations of Flows in Porous Media”, SIAM Conference on Computational Science and Engineering (CSE09), Miami Hilton Hotel, Miami, Florida, 5:30-5:55, March 2, 2009.
- 72 (Invited) “In silico modeling of angiogenesis”, Presented in the "Cells and Materials: At the Interface between Mathematics, Biology and Engineering" Reunion conference II at Lake Arrowhead, California, 10:40-11:10pm, December 9, 2008.



- 73 (Invited) “Adaptive discontinuous Galerkin methods for two-phase flow in porous media”, the Annual CSM Industrial Affiliates Meeting, ACES Building Room 6.304, the University of Texas at Austin, Austin, Texas, 2:00-2:30pm, October 29, 2008.
- 74 (Invited; presented together with Delphine Dean and Meaghan Riemer) “Modeling of growth phenomena – From angiogenesis to neurite outgrowth”, the MACOBE (Mathematics Computing Biology Engineering) Creative Inquiry seminar, Department of Bioengineering and Department of Mathematical Sciences, Edwards 308, Clemson University, Clemson, South Carolina, 3:35-4:25pm, September 3, 2008.
- 75 (Invited) “Multiscale, adaptive and conservative finite element methods for flow and transport in porous media”, Reservoir Simulation Development Group, ConocoPhillips Company, Houston, Texas, 10:30-11:30am, August 15, 2008.
- 76 (Invited) “Conservative and adaptive Galerkin methods for coupling flow and transport in porous media”, the 32nd SIAM Southeastern-Atlantic Section Conference (SIAM-SEAS 2008), University of Central Florida, Orlando, Florida, 4-4:30pm, March 14, 2008.
- 77 (Invited) “Numerical methods for modeling porous media phenomena”, the Research Introductory Seminar to First-Year Graduate Students in the Department of Mathematical Sciences, Clemson University, South Carolina, 4:00pm, January 29, 2008.
- 78 (Invited) “A locally conservative Galerkin method based on space enrichment”, Computational Mathematics Seminar, Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, 3:30-4:30pm, November 13, 2007.
- 79 (Invited) “Numerical modeling of tissue angiogenesis”, the Creative Inquiry Project Seminar of "Integrating Mathematical and Computational Science into Bioengineering Modeling and Design Problems", Department of Bioengineering and Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, 3:35-4:25pm, November 7, 2007.
- 80 (Invited) “Locally conservative methods for computing flow and transport in porous media”, School of Petroleum Engineering, China University of Petroleum-Beijing (CUPB), Beijing, China, 10:00-11:00am, August 1, 2007.
- 81 (Invited) “Adaptive and multiscale computation for porous media phenomena”, the State Key Laboratory of Scientific and Engineering Computing (LSEC), the Chinese Academy of Sciences, Beijing, China, 4:00-5:00pm, July 27, 2007.
- 82 (Invited) “Adaptive and multiscale computation for porous media phenomena”, School of Mathematical Sciences, Peking University, Beijing, China, 2:00-3:00pm, July 25, 2007.
- 83 (Invited) “Multiscale Modeling and Computation with Applications to Biomedical and Industrial Engineering”, presented to a research group in the Department of Industrial Engineering and Management at Shanghai Jiao Tong University, Shanghai, China, 2:30-4:00pm, July 18, 2007.
- 84 (Invited) “Conservation in numerical approximations of conservation laws”, Department of Mathematics, Tianjin University of Finance and Economics, Tianjin, China, 3:00-4:00pm, July 12, 2007.
- 85 (Invited) “Discontinuous Galerkin methods with applications to transport phenomena simulation in chemical engineering”, School of Chemical Engineering, Tianjin University, Tianjin, China, 10:00-11:00am, July 5, 2007.
- 86 (Contributed) “Adaptive and multiscale high-order discontinuous Galerkin methods for modeling subsurface flow and transport”, the International Conference on Spectral and High Order Methods (ICOSAHOM07), Beijing, China, June 18-22, 2007.
- 87 (Invited) “Multiscale discontinuous Galerkin methods for modeling flow and transport in porous media”, the 4th International Workshop on Simulation of Multiphysics Multiscale Systems, within the International Conference on Computational Science, Beijing, China, May 27-30, 2007.
- 88 (Invited) “Conservative post-processing of velocity in porous media”, SIAM Conference on Mathematical & Computational Issues in the Geosciences, Santa Fe, New Mexico, 10:20-10:45am, March 21, 2007.
- 89 (Invited) “Adaptive and multiscale discontinuous Galerkin methods for flow and transport in porous media”, Fluid Mechanics Seminar, Department of Civil Engineering, Clemson University, South Carolina, 3:00-3:50pm, March 2, 2007.
- 90 (Invited) “Finite element methods for modeling porous media phenomena”, the Research Introductory Seminar to First-Year Graduate Students in the Department of Mathematical Sciences, Clemson University, South Carolina, 4:00pm, February 6, 2007.

- 91 (Invited) “Local conservation in numerical solutions and its recovery”, Department of Applied Mathematics, Providence University, Taichung, Taiwan, 4:10-5:00pm, January 2, 2007.
- 92 (Invited) “Discontinuous Galerkin methods for flow and transport problems”, Series talks, Taiwan National Center for Theoretical Sciences, Mathematics Division, Taipei Office, presented at Room 308, New Mathematics Building, National Taiwan University, Taipei, 10:20-11:50am, December 26, 2006 and 10:20-11:50am, January 2, 2007.
- 93 (Contributed) “Multiscale discontinuous Galerkin methods for simulating single-phase and multi-phase flow in porous media”, the AIChE 2006 Annual Meeting, San Francisco, California, November 17, 2006.
- 94 (Invited) “Adaptive discontinuous Galerkin methods for reactive transport problems”, Applied Math Seminar, Department of Mathematics, Colorado State University, Fort Collins, Colorado, 10:00-10:50am, November 7, 2006.
- 95 (Invited) “Local conservation in numerical solutions and its recovery”, Computational Mathematics Seminar, Department of Mathematical Sciences, Clemson University, South Carolina, 1:25-2:15pm, November 1, 2006.
- 96 (Invited) “Iterative DG for air-water system”, the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 16-17, 2006.
- 97 (Co-author, with A. A. Rodriguez and others) “Upscaling of hydraulic properties of fractured porous media: Full permeability tensor and continuum scale simulations”, the Session of “Reservoir Simulation, Modeling, and Characterization II”, the 2006 SPE Symposium on Improved Oil Recovery, Tulsa, Oklahoma, 3:00-3:30pm, April 25, 2006.
- 98 (Invited) “A deterministic multiscale modeling approach for computational simulation of angiogenesis”, Department of Biomedical Informatics, Ohio State University Medical Center, 1:30-2:30pm, April 6, 2006.
- 99 (Invited) “Adaptive discontinuous Galerkin methods for porous media phenomena”, Department of Mathematics, National University of Singapore, 3:00-4:00pm, March 27, 2006.
- 100 (Invited) “Adaptive discontinuous Galerkin methods for reactive transport problems”, Department of Mathematics and Statistics, University of Maryland, Baltimore County, 11:00am-12:00, January 27, 2006.
- 101 (Invited) “Adaptive discontinuous Galerkin methods for reactive transport problems”, Department of Mathematical Sciences, Clemson University, South Carolina, 4:00-5:00pm, January 23, 2006.
- 102 (Invited) “Algorithms for modeling flow and reactive transport in porous media”, the MAA Invited Paper Session on Environmental Modeling, 2006 Joint Mathematics Meetings, San Antonio, Texas, January 12-15, 2006.
- 103 (Invited) “Modeling flow and transport in porous media: adaptive discontinuous Galerkin and streamline methods”, the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 26-27, 2005.
- 104 (Co-author, with C. W. Patrick Jr., M. Obeyesekere and M. F. Wheeler) “A 2-dimensional mathematical model of angiogenesis”, the 8th TESI (Tissue Engineering Society International) Annual Meeting, Shanghai, China, October 22-25, 2005. [Abstract published in *Tissue Engineering*, 12(4):985, 2006]
- 105 (Invited) “Recovery of local mass conservation and higher order compatibility for continuous Galerkin methods”, the 8<sup>th</sup> U.S. National Congress on Computational Mechanics (USNCCM8), Austin, Texas, July 24-28, 2005.
- 106 (Invited) “Anisotropic and isotropic mesh adaptation for primal discontinuous Galerkin methods”, the 8<sup>th</sup> U.S. National Congress on Computational Mechanics (USNCCM8), Austin, Texas, July 24-28, 2005.
- 107 (Invited) “Adaptive discontinuous Galerkin methods for coupled diffusion- and advection-dominated transport phenomena”, the 3<sup>rd</sup> International Conference on Computing, Communication and Control Technologies (CCCT '05), Austin, Texas, July 24-27, 2005.
- 108 (Invited) “Discontinuous Galerkin and mixed finite element methods for biochemical transport problems”, the International Conference on Hot Topics in Current Applied and Industrial Mathematics, Guiyang, Guizhou, China, July 13-16, 2005.
- 109 (Co-author, with C. W. Patrick Jr., M. Obeyesekere and M. F. Wheeler) “Multiscale *in silico* modeling of angiogenesis”, 2005 Summer Bioengineering Conference, Vail, Colorado, June 22-26, 2005.
- 110 (Invited) “Multiscale angiogenesis modeling”, the 2<sup>nd</sup> International Workshop on Simulation of Multiphysics Multiscale Systems (in conjunction with the ICCS'2005 conference), Atlanta, Georgia, May 22-25, 2005.

- 111 (Contributed) “*A priori* and *a posteriori* error estimates for discontinuous Galerkin methods applied to time-dependent problems”, Finite Element Rodeo, Dallas, Texas, March 4-5, 2005.
- 112 (Co-author, with M. F. Wheeler, M. Obeyesekere and C. W. Patrick Jr.) “Multiscale Angiogenesis Modeling”, the 22<sup>nd</sup> Annual Houston Conference on Biomedical Engineering Research, the Hilton Hotel and Convention Center, the University of Houston, Houston, Texas, February 10-11, 2005.
- 113 (Invited) “Adaptive discontinuous Galerkin methods for reactive transport problems”, the Applied Math - PDE seminar at UW, 114 Ingraham Building, University of Wisconsin-Madison, February 1, 2005.
- 114 (Invited) “*In silico* multiscale modeling of angiogenesis”, 1441 Genetics/Biotech Building, University of Wisconsin-Madison, January 31, 2005.
- 115 (Invited) “Dynamics of micro-vasculature”, the Annual Biomedical Engineering Conference sponsored by UT Center for Biomedical Engineering and UT Department of Biomedical Engineering, Houston, Texas, December 6-7, 2004.
- 116 (Contributed) “A dynamic, adaptive, locally conservative and nonconforming solution strategy for transport phenomena in chemical engineering”, the AIChE 2004 Annual Meeting, Austin, Texas, November 7-12, 2004.
- 117 (Contributed) “Deterministic simulation of growth factor-induced angiogenesis”, the AIChE 2004 Annual Meeting, Austin, Texas, November 7-12, 2004.
- 118 (Invited) “An iterative velocity postprocessing scheme for the compatibility with streamline tracing”, the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 26-27, 2004.
- 119 (Invited) “Mesh adaptation strategies for discontinuous Galerkin methods applied to reactive transport problems”, the 2<sup>nd</sup> International Conference on Computing, Communication and Control Technologies (CCCT '04), Austin, Texas, August 14-17, 2004.
- 120 (Invited) “Nonlinear behavior of capillary formation in a deterministic angiogenesis model”, presented in the special session of “Nonlinear dynamics in biological problems”, the 4<sup>th</sup> World Congress of Nonlinear Analysts, Orlando, Florida, June 30 - July 7, 2004.
- 121 (Invited) “*A posteriori* error estimates for reactive transport”, Joint PET/ARL/AHPCRC Workshop on Discontinuous Galerkin Methods for Computational Mechanics, Army High Performance Computing Research Center (AHPCRC), University of Minnesota, Minneapolis, Minnesota, May 10, 2004.
- 122 (Co-author, with M. F. Wheeler and C. Dawson) “Mathematical issues in multiphysics couplings”, the 8<sup>th</sup> Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, March 28 – April 2, 2004.
- 123 (Contributed) “Projections of velocity for the compatibility with transport”, Finite Element Rodeo, Austin, Texas, March 5-6, 2004.
- 124 (Invited) “Primal discontinuous Galerkin methods for reactive transport in porous media”, the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 21-22, 2003.
- 125 (Co-author, with M. F. Wheeler) “Discontinuous Galerkin methods for coupled flow and reactive transport problems”, ADAPT '03: Conference on Adaptive Methods for Partial Differential Equations and Large-Scale Computation, Rensselaer Polytechnic Institute, Troy, New York, October 11-12, 2003.
- 126 (Contributed) “Discontinuous Galerkin methods for modeling flow and reactive transport”, the 7<sup>th</sup> U.S. National Congress on Computational Mechanics (USNCCM7), Albuquerque, New Mexico, July 28-30, 2003.
- 127 (Invited) “Numerical computation of ANDRA-Couplex1 test case using locally conservative methods”, SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS03), Austin, Texas, March 17-20, 2003.
- 128 (Invited) “Discontinuous Galerkin Method for Reactive Transport”, the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 24, 2002.
- 129 (Invited) “Combining mixed finite elements for flow and discontinuous Galerkin for transport in modeling miscible displacement in porous media”, Minisymposium on Discontinuous Galerkin Methods for Partial Differential Equations, SIAM 50<sup>th</sup> Anniversary Meeting, Philadelphia, July 8-12, 2002.
- 130 (Co-author, with M. Peszynska) “Reactive transport model coupled to multiphase flow models”, International Conference on Computational Methods in Water Resources XIV, Delft, June 2002.
- 131 (Co-author, with M. F. Wheeler et al.) “Discontinuous Galerkin method for modeling flow and reactive transport in porous media”, Le 34<sup>ème</sup> Congrès National d'Analyse Numérique (CANUM 2002), Anglet, France, May 27-31, 2002.

- 132 (Co-author, with M. F. Wheeler et al.) "Simulation of multi-species multi-physics phenomena in porous media using a non-conforming and locally conservative method", International Conference on Multifield Problems, Stuttgart, Germany, April 6-10, 2002.
- 133 (Co-author, with M. Peszynska et al.) "Coupling of models for multiphase flow and transport in porous media with multiple scales", IMA Minisymposium: Numerical Methods in the Geosciences, March 13-15, 2002.
- 134 (Invited) "Reactive transport model in IPARS and its environmental applications", the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 31, 2001.
- 135 (Co-author, with B. Riviere and M. F. Wheeler) "A combined mixed finite element and discontinuous Galerkin method for miscible displacement problem in porous media", International Conference on Computational and Applied PDEs, Zhangjiajie National Park of China, July 1-7, 2001.
- 136 (Invited) "Multiphase reactive models in IPARS", the Annual CSM Industrial Affiliates Meeting, Austin, Texas, October 11-12, 2000.
- 137 (Contributed) "The liquid mixing behavior in a column containing corrugated structured packing", the 2<sup>nd</sup> China-US Conference in Chemical Engineering, Beijing, China, May 1997.
- 138 (Contributed) "Liquid distribution in a large scale column containing corrugated plate packing", the 8<sup>th</sup> National Conference of Chemical Engineering, Tianjin, China, October 1996.
- 139 (Contributed) "The distillation simulation in a large scale column containing structured packing with three dimensional non-equilibrium mixing-pool model", the 8<sup>th</sup> National Conference of Chemical Engineering, Tianjin, China, October 1996.
- 140 (Co-author, with Z. Jiang) "Simulation of multistage fluidized bed adsorption process by Monte Carlo method", the International Conference of Reactive Polymers, Xi'an, China, 1994.

## OTHER EXPERIENCES

### Member of

- AMS (American Mathematical Society)
- SIAM (Society for Industrial and Applied Mathematics)
- SPE (Society of Petroleum Engineers)
- USACM (United States Association of Computational Mechanics)

### University Service

- Judge, The 2013 KAUST Graduate Student and Postdoc Poster Competition (In the 4<sup>th</sup> WEP held in KAUST, January 12 to January 30, 2013).
- Member, Program Committee for the 4th Winter Enrichment Program (WEP) (The 4<sup>th</sup> WEP held in KAUST, January 12 to January 30, 2013).
- Member, Visiting Student Task Force (a university level committee), KAUST, September 2011 – December 2011.
- Faculty advisor, the SPE student chapter at KAUST, KAUST, February 2011 – Present.
- Member, Faculty Hiring Committee, Earth Science and Engineering Program, KAUST, November 2012 – Present.
- Member, Faculty Search and Selection Committee, Strategic Initiative for Extreme Simulation, KAUST, November 2012 – Present.
- Chair, Faculty committee for establishing the SPE student chapter at KAUST (Committee consisting of Professors V. Calo, I. Hoteit, S. Sun and Y. Wu), KAUST, September 2010 – January 2011.
- Member, Faculty Hiring Committee, Applied Mathematics Program, KAUST, September 2010 – August 2011.
- Member, Faculty Hiring Committee, Earth Science and Engineering Program, KAUST, December 2009 – November 2011.
- Chair, Graduate Student Admission Committee, Earth Science and Engineering Program, KAUST, September 2013 – Present.
- Member, Graduate Student Admission Committee, Earth Science and Engineering Program, KAUST, September 2009 – November 2010, and September 2011 – November 2012.

- Member, Graduate Student Admission Committee, Applied Mathematics Program, KAUST, September 2009 – September 2010.
- Member, The Graduate Affairs Committee of Department of Mathematical Sciences, Clemson University, August 2008 – August 2009.
- Member, The Research Committee of Department of Mathematical Sciences, Clemson University, August 2006 – August 2008.

#### Referee for Journals and Symposia

- 1) *Advances in Applied Mathematics and Mechanics (AAMM)*, since 2010
- 2) *Advances in Computational Mathematics*, since 2012
- 3) *Advances in Mechanical Engineering*, since 2011
- 4) *Advances in Water Resources*, since 2009
- 5) *Annals of Biomedical Engineering*, since 2006
- 6) *Applied Mathematical Modelling*, since 2007
- 7) *Applied Mathematics and Computation*, since 2009
- 8) *Applied Mathematics Letters*, since 2012
- 9) *Central European Journal of Mathematics*, since 2011
- 10) *Communications in Computational Physics*, since 2007
- 11) *Communications in Numerical Methods in Engineering*, since 2005
- 12) *Computational and Mathematical Organization Theory (CMOT)*, since 2011
- 13) *Computational Geosciences*, since 2007
- 14) *Computer Methods in Applied Mechanics and Engineering*, since 2004
- 15) *Computers and Fluids*, since 2010
- 16) *Computers and Geotechnics*, since 2007
- 17) *Computers and Mathematics with Applications*, since 2005
- 18) *Discrete and Continuous Dynamical System B. Centered around dynamics (DCDS-B)*, since 2008
- 19) *Documenta Mathematica (a German Journal)*, since 2008
- 20) *Heat Transfer Engineering*, since 2011
- 21) *IEEE SMC-C Trans. (Transactions on Systems, Man, and Cybernetics--Part C: Applications and Reviews)*, since 2010
- 22) *IMA Journal of Numerical Analysis*, since 2010
- 23) *ISRN Applied Mathematics*, since 2011
- 24) *International Journal for Multiscale Computational Engineering*, since 2007
- 25) *International Journal for Numerical Methods in Engineering*, since 2010
- 26) *International Journal for Numerical Methods in Biomedical Engineering*, since 2011
- 27) *International Journal of Control*, since 2009
- 28) *International Journal of Modelling and Simulation*, since 2007
- 29) *International Journal of Numerical Analysis and Modeling (IJNAM)*, since 2010
- 30) *International Journal of Numerical Analysis & Modeling, Series B (IJNAMB)*, since 2010
- 31) *International Journal of Production Research (IJPR)*, since 2010
- 32) *International Journal of the Physical Sciences*, since 2010
- 33) *Inverse Problems*, since 2009
- 34) *Journal of Applied Mathematics*, since 2010
- 35) *Journal of Canadian Petroleum Technology*, since 2010
- 36) *Journal of Computational and Applied Mathematics*, since 2007
- 37) *Journal of Computational Mathematics*, since 2007
- 38) *Journal of Computational Physics*, since 2009
- 39) *Journal of Engineering Mathematics*, since 2006
- 40) *Journal of Hydrology*, since 2012[]
- 41) *Journal of Inequalities and Applications*, since 2009
- 42) *Journal of Porous Media*, since 2008
- 43) *Journal on Scientific Computing*, since 2008
- 44) *Journal of Systemics, Cybernetics and Informatics*, since 2006
- 45) *Journal of the Taiwan Institute of Chemical Engineers*, since 2008
- 46) *Kuwait Journal of Science*, since 2012
- 47) *Mathematical Biosciences*, since 2009

- 48) *Mathematical Biosciences and Engineering (MBE Journal)*, since 2006
- 49) *Mathematical Problems in Engineering*, since 2011
- 50) *Methods of Mathematical Modeling and Applications (M3AS)*, since 2012
- 51) *Nonlinear Analysis Series A: Theory, Methods & Applications*, since 2009
- 52) *Numerical Mathematics: Theory, Methods and Applications*, since 2010
- 53) *Numerical Methods for Partial Differential Equations*, since 2007
- 54) *Numerische Mathematik*, since 2007
- 55) *Scientific Journals International*, since 2007
- 56) *Special Topics & Reviews in Porous Media*, since 2010
- 57) *SIAM Journal on Applied Mathematics*, since 2012
- 58) *SIAM Journal on Multiscale Modeling and Simulation*, since 2005
- 59) *SIAM Journal on Numerical Analysis*, since 2006
- 60) *SIAM Journal on Scientific Computing*, since 2004
- 61) *Water Resources Research*, since 2005
- 62) *Water Research*, since 2010
- 63) *The International Conference on Computational Science 2007 (ICCS 2007)*, 2007
- 64) *The 3<sup>rd</sup> International Conference on Computing, Communications & Control Technologies*, 2005
- 65) *The 16<sup>th</sup> International Conference on Information Systems Analysis & Synthesis (ISAS 2010)*, 2010
- 66) *The Conference on Hot Topics in Current Applied and Industrial Mathematics at Guiyang*, 2005
- 67) *The 15<sup>th</sup> International Symposium on Domain Decomposition Methods*, 2003

**Referee for Funding Agencies**

- 1) *Georgia National Science Foundation*, since 2007

**Reviewer for**

*Mathematical Reviews*, since 2006

**Computers**

Profound knowledge of MATLAB, Java, C, C++ and FORTRAN  
Knowledge of UNIX, Mac OS X and Windows operating systems  
Rich experience in object-oriented programming and parallel computing  
Good knowledge of LaTeX, Perl, Python, HTML, JavaScript  
Experience of Maple, Mathematica, Scilab, Tecplot, LyX, MS-Office

**Languages**

Native speaker of Chinese (speaking fluent Mandarin, Cantonese and several other Chinese dialects)  
Good knowledge of English (speaking fluent American English)  
Elementary Japanese  
Elementary Arabic